DOCUMENT RESUME

ED 132 302 CE 008 602

TITLE	Policy Implications of Current Research in Agricultural Education. Central Region Research Conference in Agricultural Education. Proceedings of Annual Meeting (29th, Columbia, Missouri, July 29-31, 1975).
INSTITUTION	Missouri Univ., Columbia.
PUB DATE	Jul 75
NOTE	121p.
EDRS PRICE	MF-$0.83 HC-$6.01 Plus Postage.
DESCRIPTORS	*Agricultural Education; Conferences; Curriculum; *Educational Improvement; Educational Needs; *Educational Planning; Educational Policy; Educational Research; Foreign Countries; High School Students; Policy Formation; *Program Evaluation; Secondary Education; Speeches; Statewide Planning; Vocational Agriculture

ABSTRACT

Research on the following topics is presented in this publication: "Analysis of Factors Related to the Educational Plans of Iowa Vocational Agriculture Students," "Development of a Statewide System for Follow-up of Vocational Graduates that Has Implementation for Usage by Local Educational Agencies," "Factors Influencing Ninth and Tenth Grade Vocational Agriculture Enrollment Decisions and Level of Competency of Students Entering Area Vocational Centers," "Determination of A Common Core of Basic Skills for Vocational Agriculture Instruction," "A Comparison of Agricultural Education Students and Students in Other Agricultural Curricula and Factors Related to Their Curriculum Choice," "Development of Instructional Materials for Use by Indiana Vocational Teachers in Teaching Leadership and Character Development to Youth in Indiana," "Effects of Class Time, Practice Time, and Teaching Methods Upon Cognitive and Psychomotor Skill Achievement in Teaching Small Gas Engines," "The Dissemination/Diffusion Process in Selected Florida Schools," "Agricultural Education System/Process: The Diffusion of Agricultural Technology with a Discussion of the Contest as a Diffusion Technique," "A Method for Record-Keeping and Analysis of Equipment and Related Costs by Educational Program," and "Evaluation of Agricultural Education Program Activities at the Federal University of Santa Maria, Brazil, 1971-1973." Each topic contains the purpose of the study, procedures or methods used, and a summary. A copy of the program, list of participants, and the minutes of the meeting are included. (HD)

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TWENTY-NINTH ANNUAL MEETING

CENTRAL REGION RESEARCH CONFERENCE
IN
AGRICULTURAL EDUCATION

PROCEEDINGS

THEME . . .
POLICY IMPLICATIONS OF CURRENT
RESEARCH IN AGRICULTURAL EDUCATION

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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JULY 29-31, 1975

UNIVERSITY OF MISSOURI - COLUMBIA
COLUMBIA, MISSOURI

CE 008 602

ACKNOWLEDGMENTS

As conference coordinator, I would like to recognize the following team members who were largely responsible for the successes of the research conference.

The advisory committee met in Chicago during the winter meeting and made valuable input toward the program organization. The members included J. Robert Warmbrod, J. Franklin Bobbitt, W. B. Richardson, H. J. Hoerner, Curtis R. Weston, Gene M. Love, and Bob R. Stewart.

The local planning committees met several times during the spring and early summer to identify and delegate responsibilities. The committees and members include: Registration and Information, Gene Love and Dave Glotfelty; Housing and Transportation, Curtis Weston and Bob Carlile; Meal Fuctions, Bob Stewart, Bob Carlile, and Jim MacLean; Ladies Program, Alice Shinn, Helen Love, Bonnie Stewart, and the graduate wives; Paper Selection, Don Osburn and Jim MacLean.

Special recognition is due the keynote speaker, Dr. Earl S. Webb. He brought a very practical tone to the meeting.

The paper discussants included Don Osburn, Carl Humphrey, David Williams, Earl Russell, and Bob Warmbrod. I believe they added an objective perspective to the discussion of the research.

Finally, sincere thanks to Dr. Nguyen H. Son for editing the proceedings and to Belva Dowell, Laura Jones, and Lori Shultz for typing the final manuscripts.

Glen C. Shinn
Associate Professor

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Research - A Practical Approach

Earl S. Webb[1]

As a practical approach to our discussion this morning, we should look at research as a means of learning what is not known by the researcher or perhaps not known by anyone. The unknown may range from the number of objects or cases in existence to the kind of reaction that may result from an external or internal stimulus. It may be how to get from there to here. Regardless of the nature of the unknown, research is motivated by a need to know. The need to know, then, is the reason for research.

Research has certain basic characteristics. First the problem must be contemplated, identified, and defined. Second, the cause of the problem must be hypothesized or a guess be made as to its cause. Next data must be obtained and analyzed to see if the cause was what it was thought to be. Then a conclusion is reached and can be rather simply stated as to whether you guessed right or wrong. If you guessed right you can support your hypothesis. If not, you can go back, make another guess and go through the process again.

Design is important; its purpose is (1) to provide answers to research questions and (2) to control variance. Design enables researchers to answer research questions as validly, objectively and as accurately as possible. Emphasis must be placed upon the questions to be asked and the design will help provide the answers.

A great deal of time could be spent defining research and discussing different designs. While such a discussion might be interesting it would likely be rather sterile. Therefore, let me conclude by saying the function of research is to fulfill the need to know and connot be defined merely in terms of scope, costs, or other tangibles.

Research is a highly personal activity because it reflects the basic nature of the researcher whether the research is experimental, descriptive, or developmental. The conservative tends to select traditional problems using traditional designs. The liberal launches into new areas and tries unusual methods. The egoist is concerned mainly with research design because it provides him with an ego trip and is an end rather than a means. The pessimist tries to find all that's wrong - whereas the optimist tries to discover all that's good. Complete objectivity is a goal to be sought but seldom achieved in educational research.

Research reflects the concerns and dedication of a group. A look at research in agricultural education from 1917 to about 1945 shows the major concerns were competence of teachers, administration, and curriculum. Shortly after World War II, we were concerned about changing the purpose of vocational agriculture, and conducted many follow-up studies to show that a majority of former students would not or could not enter farming. This period was followed by emphasis on counseling; efforts were made to show counselors that many employment opportunities were available in agriculture. With the passage of the Vocational Act of 1963, efforts were directed toward the expansion of programs into agribusiness. Manpower studies were launched locally, regionally, and nationally with varying degrees of success.

The latest concern seems to be in the area of competencies. These studies are of major importance at a time when programs are changing rapidly and radically. While our research may from time to time become distorted by an over-emphasis on some aspect of our program, a good balance among programs is usually maintained.

When research in agricultural education is compared with other specialized fields of education we can take pride in our efforts. This situation has, no doubt, been the result of adversity because we have been under attack almost annually from those who lack the facts about agriculture and its place in the economy. While we have done a good job in the past the challenge exists for us to do better in the future. However, a few deterrents continue to impede our research efforts and need to be corrected. These are:

1. Negative attitudes developed by graduate students toward research.
   The thesis or dissertation is often left on a graduate program in education as the last and most difficult hurdle to be overcome. By the time the student has pleased all committee members and the graduate dean, completed all forms, and passed his final examination he is so exhausted and confused that he never wants to hear the word research again. He earned the degree in the first place so he could teach; not to do research.
2. Tendency to belittle our research.
   Problems may be limited in scope but if research techniques are followed, the results can be respectable and are often more fruitful than some large projects. There is no magic in bigness. Many national and regional studies have produced limited results because they were not properly coordinated or were beyond the expertise of the researchers.
3. Conducting research on a problematic rather than a programmatic basis.
   Most of us have learned that problems within areas are interrelated. In writing a research report we usually recommend that a number of studies be made, place the report on the shelf, and

think we have completed our job. The truth is we have found a place to begin a research program.

4. A lack of time.

This is the most frequent reason given for not conducting research. Efforts and time for all activities are a matter of priority. The person who sincerely wants to develop a research program will find the time. Furthermore, administrators will see that time for research is provided for those who sincerely want to do it.

What is Needed in Research

Our first need now, as always, is good ideas for new programs and for improving old ones. Most researchers, however, complicate the process of testing ideas by trying to wrap them in research design. They dislike the looseness with which they must be tested. If Jesus had been like some of my professional colleagues, Christianity would never have developed because the F-value would not have shown a significant difference between Christianity and Judaism.

Secondly we need to keep our research oriented specifically to agricultural problems. It's always exciting to move into new areas of research because we may grow weary of investigating what may seem commonplace. However, our first responsibility is to the program for which we are responsible. Agricultural education must continue to be oriented specifically to problems in agriculture and to the rural environment. At a time when we are fighting to maintain our identity, we must stay with the basics of our program. The voice of the Department of Labor grows louder each year in its quest to take over vocational education and in some areas it might do a better job than is being done now; but not in agriculture where it has little expertise.

Thirdly, from a practical point of view, the basic need for a change in research in agricultural education is to move from a single problem approach in agriculture to that of a problem area in agriculture in which a series of related problems in agriculture can be investigated over a period of from three to five or more years. A growing need exists for a continuous research program in each of the following areas where we have more expertise than anyone else.

1. Competencies of teachers of vocational agriculture.

   A continuous assessment needs to be made in this area. Many persons being certified to teach have limited backgrounds in the practical aspects of farming. It's not unusual now to find teachers of vocational agriculture who were reared in town and who know little about how plants are grown or how to perform mechanical skills commonplace to a farm-reared person. I am told that some students in the College of Agriculture at Texas A & M University did not know how to tell the sex of farm animals when they enrolled. Some of these students may become teachers of agriculture. Competence of teachers in new programs is of grave concern. In a study I conducted, many former students were critical of the technical competence of teachers of the pre-employment laboratory in farm machinery service and repair. It may be as difficult to make a tradesman out of a teacher as it is to make a teacher out of tradesman. We have tried to make tradesmen out of teachers.

2. High school agricultural courses and methods.

   Today we have more and more students who know less and less about agriculture which dictates changes needed in the content of vocational agriculture courses. What is the basis of course content today?

What use is to be made of the knowledge and skills gained? What is the purpose of a production agriculture program when, perhaps, not a single student in our class will have an opportunity to farm? How relevant is the content of non-production agriculture courses? Are the most appropriate methods used in teaching?

3. Agricultural occupational experience programs of students.

   Radical changes have occurred in recent years as we moved from the traditional supervised farming programs into cooperative and laboratory training.

   Some evidence suggests that serious problems exists in this area. However, their true nature and extent are not known. Work experience may be the outcome of some of our programs rather than occupational competence. There are no doubt many cases where adequate controls are not exercised to prevent exploitation in the name of education.

4. Continuing education in agriculture.

   With increasing pressure on public schools to serve more and more people in more and more ways radical changes need to be made in programs of adult education in agriculture. The traditional concept of adult and young farmer education must be replaced by programs of continuing education to serve not only farmers, but all the people in the community who have agricultural interests. Who needs to be served and in what way, are questions that still must be answered.

5. Agricultural teaching laboratories.

   In our State a tremendous amount of money is invested in land owned by schools which is being utilized in sundry ways for teaching purposes. School farms and land laboratories will become increasingly important as more and more of our students have less and less practical farm experience. How can this land be utilized most effectively for educational purposes?

6. Manpower needs in agriculture.

   This is an area that needs continuous attention in spite of the difficulties encountered. Through work done within the past five years, techniques have been developed that render rather valid data about the manpower needs in agricultural occupations. While we may be fairly well satisfied as of now, a constant need exists for adjustments in accordance with labor market demands, for new levels of competence, and for retraining. Equally critical is the need for techniques to help local schools determine needs for and adjustments in vocational agriculture programs.

7. Rural youth leadership programs.

   We take pride in knowing that most youth organizations have adopted many of the developmental activities pioneered by students in vocational agriculture. A danger exists, however, that our pride will foster an attitude of complacency. Just as everything else changes, so are youth different from those a few years ago. Affluence has its price and creates problems that may be reflected in youth organizations. We need to know the general characteristics, needs, aspirations, and expectations of students enrolled in vocational agriculture in order to prepare teachers to cope with the problems they will encounter on the job.

8. Agricultural mechanics.

   Perhaps the most valuable lifetime contribution we can make to any student is the development of skills in the use of tools. A great deal of emphasis in the past several years has been on farm machinery maintenance and repair. While this has been good, it has often been at the expense of some of the basic skills. The most valuable courses I had in college, were the ones taught by Mack Jones and LeRoy Day here at the University. I learned basic skills that I still use almost every day in the repair and maintenance of my home and automobiles. A good probability exists that we need to go back to the basics. We may have students who can weld but don't know how to sharpen a twist drill.

9. Evaluation of agricultural education.

The Texas legislature during the session just completed, mandated that the State Budget board conduct an evaluation of vocational education. We are concerned because we don't know what criteria will be used. How good are our records of graduates? Perhaps the time is near when we will need new and valid data to justify vocational agriculture. Furthermore, we are rapidly approaching the time in our State when teachers of vocational agriculture will be employed 10 months like other vocational teachers. If our program is like theirs why shouldn't we be treated the same way? Evaluation seems to be especially critical in determining the contributions all programs make in meeting the needs of the labor force and in providing self-fulfillment of workers. In some cases, a need may exist for an examination of our morality for encouraging students to prepare for occupations in which they cannot make a living. In some situations, we may contribute more to welfare rolls than to economic independence.

What is a Practical Approach to Conducting Research

While the major function of research is to discover new knowledge, it is also the primary means of developing scholarship. Therefore, my first recommendation is that every member of an agricultural education faculty be responsible for a research program. I know this is not a popular statement, but let's look at the advantages.

1. Most of you are faculty members of a university that emphasizes the functions of teaching, research, and extension. Historically, research has provided content for teaching and extension; it still serves that function. Whether we like it or not, the recognized scholars within the academic community are those involved in research and who publish frequently. I often hear on our campus that good teaching is equivalent to research for purposes of promotions; however, some of our best teachers with long tenures have not been promoted to professor nor have their salaries kept pace because they have neither conducted research nor published.
2. Research contributes to good teaching. Research is the only means by which a teacher can continually bring new things to his classes. His only contribution is the product of his research; everything else is borrowed from someone. A teacher's status is enhanced through research; students like to read what their professors have published; they like to hear about their research. Students hear about research in animal science, agronomy, etc. Why not in agricultural education?
3. Research is the means by which faculty members become specialists. Far too many of us know a little about a lot but not much about anything. The specialist can focus his research, his reading, and his activities. He has direction.

4. Professors involved directly in research set good examples for graduate students. How can good attitudes toward research be developed if professors are not involved directly. Research conducted for a thesis or a dissertation under a professor not involved in research may appear to graduate students as a penalty for earning an advanced degree.

5. A research program provides a basis for students being assigned to a specific professor. Students should conduct research in the area of their interests; therefore, they should be allowed to work with the person in the department who has the greatest degree of expertise in that area. What other good reason exists for assigning a student to work with a faculty member?

My second recommendation as a practical approach for conducting research is that each faculty member seek a research appointment on hard money. Persons on soft money experience a feeling of insecurity from year to year and spend an excessive amount of time writing proposals and making reports that could be utilized more productively on an ongoing research program. The best source of hard funds is with an agricultural experiment station. Appointments should not be difficult to obtain because the kind of research we are well-qualified to conduct is a part of the mission of the Agricultural Research Service of the USDA. Those of us who have such appointments enjoy being a part of an organization dedicated to the study of problems in agriculture.

Thirdly, I recommend that a long range goal be established to move the major research effort in education away from the ivy tower of a university to locations where the action is. We need educational research units located in various parts of the state similar to the stations and substations of the agricultural experiment station. Such a state-wide organization would allow on-location research where adequate controls could be exercised for more meaningful and valid research. We will never be as effective as we would like to be as long as research is confined to ivy towers with all their distractions. Personnel at stations could work directly with schools in conducting research, teaching and organizing off-campus graduate classes, and providing services needed so badly by public school faculties.

Summary

In summary the following points seem to be practical and need to be restated:

1. Our primary efforts in programs and in research must be directed toward the solution of agricultural and rural problems.
2. All faculty members should be involved in research and develop a high level of expertise in one or more problem areas.
3. All faculty members should seek research appointments on hard funds.

Let me close by saying if we are not proud of our research we should increase our efforts to improve it. We have those in our ranks who are extremely critical of research in agricultural education. They seem to be content to sit on the sidelines and criticize. Perhaps they find fulfillment in tearing down what others try to build.

I watched them tearing a building down,
A gang of men in a busy town,
With a "Ho, Heave, Ho" and a lusty yell
they swung a beam and the side wall fell

I asked the foreman, "Are these men skilled,
and the kind of men that you'd hire to build?"
He gave a laugh and said, "No indeed!
Just common labor is all I need."

And I thought to myself as I went away,
"Which of these roles have I tried to play?
Am I a builder who works with care,
Measuring life by the rule and square;
or am I a wrecker who walks the town
content with the labor of tearing down?"

Have a good conference!

---

[1] Dr. Earl S. Webb, Professor, Agricultural Education Department, Texas A&M University, College Station, Texas.

Analysis of Factors Related to the Educational Plans of Iowa Vocational Agriculture Students

Bennie L. Byler[2]

Purpose of Study

The primary purpose of this research was to determine if there are differences in selected factors related to the educational plans among the following groups of high school students:

Group 1 - Vocational agriculture students who plan to attend a postsecondary area vocational school.

Group 2 - Vocational agriculture students who plan to attend a four-year college or university.

Group 3 - Vocational agriculture students who plan to enter the world of work and not attend college.

The variables that were considered in this study are as follows:

1. Educational plans of high school vocational agriculture students.
2. Personal, family and community variables related to educational plans.
3. Agribusiness Achievement Test Scores.

Procedure

The population for this study consisted of all junior and senior students enrolled in secondary vocational agriculture programs in Iowa. A sample of thirty schools was selected to participate.

The following instruments were administered to a sample of 623 junior and senior vocational agriculture students:

1. _Personal, Family, and Community Data Related to Educational Plans of Iowa Vocational Agriculture Students_.
2. _Agribusiness Achievement Test_ by Peterson, _et al_.

Chi-square, analysis of variance, and coefficient of correlation tests were used to analyze the data from these instruments.

Summary of Findings

Educational Objectives of Junior and Senior Vocational Agriculture Students

The number of students and combined grade levels grouped by their educational plans are presented in Table 2.

Of the 623 students participating in this study, 26.8 per cent planned to attend a postsecondary area vocational school; 17.3 per cent planned to attend a four-year college or university; and 55.9 per cent planned to enter the world of work upon graduation from high school.

TABLE 2

Number of junior and senior students and percentage, of combined grade levels grouped by educational plans.

Group Number	Student Group	Grade Level		Total	Percent
		Junior	Senior		
1	Students who planned to attend a postsecondary area vocational school.	92	75	167	26.8
2	Students who planned to attend a four-year college or university.	62	46	108	17.3
3	Students who planned to enter world of work.	204	144	348	55.9
	Total	358	265	623	100.0

Grades Received in Vocational Agriculture

From the results of a three-way analysis of variance and Scheffe multiple comparison, it may be concluded as follows:

1. Students planning to attend a four-year college or university received higher grades in vocational agriculture than students planning to attend a postsecondary area vocational school.
2. Students planning to get a full-time job or become self-employed and not to attend college received lower grades in vocational agriculture than those students planning to receive additional formal education beyond high school.

Grades Received in All Courses

Results of a three-way analysis of variance and Scheffe multiple comparison indicate that students who planned to attend a four-year college or university received higher grades in all their courses than did students who planned to attend an area vocational school. Students who planned to complete formal education beyond high school normally received higher grades in all their courses than students who planned to enter the world of work upon graduation from high school.

Place of Residence

Over 81 per cent of the students participating in this study indicated that they were living on a farm. Data collected for this variable were analyzed using the chi-square statistic. No significant relationship existed between students' place of residence and students' educational plans upon graduation from high school.

Work Experience While in High School

The majority (51.6) of the students sampled indicated that they sometimes worked outside their family and home or farm. Over 29 per cent of the students in the three groups indicated that they had a fairly regular job outside their family and home or farm. Whereas, 19 per cent of the students sampled indicated that they did not work outside the family and home or farm.

Results of the chi-square test indicate that a relationship did not exist between the extent of students' working outside the family and home or farm, and students' educational plans.

"Significant Others" Influencing Occupational Choice

The majority (47 per cent) of students in all three groups indicated that their father had the most influence on their choice of occupation. A greater per centage (52.6 per cent) of students who planned to get a job upon completion from high school indicated that their father had the most influence on their choice of occupation. This is in comparison to 42.9 per cent for Group 1 and 34.4 per cent for Group 2.

Results of a chi-square test indicate that a relationship did exist between students' response to the person having the most influence on their choice of occupation, and their educational plans.

Amount of Certainty Regarding Occupational Choice

By applying the analysis of variance and multiple comparison, it was found that students who planned to enter the world of work were more certain of their choice of occupation than students who planned to attend a four-year college or university. No other significant differences were observed.

Amount of Work Experience in Planned Occupation

It may be concluded from the findings that students who planned to enter the world of work indicated that they had received a greater amount of work experience for the occupation they planned to enter than students who planned to continue their formal education beyond high school. Also, students who planned to attend a postsecondary area vocational school indicated that they had received a greater amount of work experience for the occupation they are planning to enter than students who planned to attend a four-year college or university.

Value of High School Training for Planned Occupation

It was found that students who planned to attend a postsecondary area vocational school indicated a higher rating in regard to their perception of the value of their high school training for the occupation they are planning to enter than did students who planned to enter the world of work upon graduation from high school.

Amount of High School Training Provided for Planned Occupation

There was a difference among schools participating in the study as to students' perceptions of the value of their high school training for the occupation they are planning to enter. The findings also indicate that students who planned to attend a postsecondary area vocational school perceived their high school as providing a greater amount of training for the occupation they are planning to enter than did students who planned to enter the world of work upon graduation from high school.

Amount of Encouragement Received from Father and Mother to Continue Education Beyond High School

It was found that students who planned to obtain posthigh school education had received more encouragement from their father to do so than did students who planned to enter the world of work upon graduation from high school. From this observation, it would appear that the father does have a definite influence upon their children's plans for attending college.

The findings also indicate that students who planned to attend college had received a greater amount of encouragement to do so from their mother than did students who did not plan to attend college. Also, students who planned to attend a four-year college or university had received a greater amount of encouragement from their mother to continue their education beyond high school than did students who planned to attend a postsecondary area vocational school.

Amount of Encouragement Received from Father and Mother to Attend a Area Vocational School

It may be concluded from the findings that students who planned to attend an area vocational school had received a greater amount of encouragement from their father to attend an area vocational school than did students who planned to attend a four-year college or university and students who planned to enter the world of work.

The findings also indicate that students who planned to attend an area vocational school had received a greater amount of encouragement to do so from their mother than did students in the other two groups. Students who planned to attend a four-year college or university had received a greater amount of encouragement to attend a area vocational school than did students who planned to enter the world of work.

Amount of Encouragement Received from Father and Mother to Attend a Four-Year College or University

It was found that students who planned to attend a four-year college or university had received a greater amount of encouragement from both their father and mother to do so than did students in the other two groups. Also, students who planned to attend an area vocational school had received a greater amount of encouragement from both their father and mother to attend a four-year college or university than did students who planned to work.

Amount of Encouragement Received from Vocational Agriculture Instructor to Attend an Area Vocational School

Significant differences in the amount of encouragement to attend an Area Vocational school were observed in grade levels and among schools. It was also found that students who planned to continue their formal education beyond high school had received a greater amount encouragement from their vocational agriculture instructor to attend an area vocational school than did students who planned to enter the world of work.

Amount of Encouragement Received from Vocational Agriculture Instructor to Attend a Four-Year College or University

All sources of variation analyzed were significant at the .05 or .01 level of probability. It may be concluded from the findings that students who planned to attend a four-year college or university had received a greater amount of encouragement to do so from their vocational agriculture instructor than did students who planned to attend an area vocational school or students who planned to enter the world of work. Also, students who planned to attend an area vocational school had received a greater amount of encouragement from their vocational agriculture instructor to attend a four-year college or university than did students who planned to enter the world of work.

Value of Vocational Agriculture Courses Completed in Preparing to Attend an Area Vocational School

Significant differences in the value of vocational agriculture courses among schools were observed. The findings indicate that students who planned to continue their formal education beyond high school perceived their vocational agriculture courses completed as being of greater value in preparing them to attend an area vocational school than did students who planned to enter the world of work upon graduation from high school

Value of Vocational Agriculture Courses Completed in Preparing to Attend a Four-Year College or University

There was a significant variation among schools in response to this variable. From the statistical analysis, it may be concluded that students who planned to attend a four-year college or university indicated a higher value regarding vocational agriculture courses completed in preparing to attend a four-year college or university than did students who planned to attend an area vocational school and students who planned to get a full-time job. Also, students who planned to attend an area vocational school perceived their vocational agriculture courses to be of greater value in preparing to attend a four-year college or university than did students who planned to get a full-time job.

Value of High School Courses Completed in Preparing to Attend a Post-Secondary Area Vocational School

Significant differences in the value of high school courses among schools were observed. It was also found that students who planned to continue formal education beyond high school placed a greater value on their high school courses completed in preparing to attend an area vocational school than did students who planned to enter the world of work.

Value of High School Courses Completed in Preparing to Attend a Four-Year College of University

It may be concluded from the findings that students who planned to attend a four-year college or university placed a greater value on their high school courses in preparing them to attend a four-year college or university than did students in the other two groups. Also, students who planned to attend an area vocational school placed a greater value on their high school courses completed in preparing to attend a four-year college or university than did students who planned to enter the world of work.

Students' Level of Achievement in Agriculture

In relation to students' level of achievement in agriculture, the findings may be concluded as follows:

1. Students who planned to attend a four-year college or university possessed a higher level of achievement in animal science than did students in the other two groups. Also, students who planned to attend an area vocational school possessed a higher level of achievement in animal science than did students who planned to enter the world of work.

2. Students who planned to attend a four-year college or university possessed a higher level of achievement in plant and soil science than did students who planned to attend an area vocational school. The latter group, in turn, possessed a higher level of achievement in plant and soil science than students who planned to enter the world of work.

3. No significant difference in agricultural mechanics achievement was observed among students grouped by their educational plans.

4. Students who planned to attend a four-year college or university possessed a higher level of achievement in agricultural management than did students in the other two groups. Also, students who planned to attend an area vocational school possessed a higher level of achievement in agricultural management than did students who planned to enter the world of work.

Summary

The findings of this study indicate that approximately 43 per cent of the junior and senior students sampled planned to receive additional formal education upon graduation from high school. Almost 60 per cent of those students planning to receive additional education, planned to attend a postsecondary area vocational school. Consequently, increased efforts should be made by vocational guidance counselors, agriculture instructors and other secondary and postsecondary personnel in assisting youth with decisions relating to their future educational plans.

It should also be pointed out that over 55 per cent of the students participating in this study planned to receive no formal education beyond high school. Therefore, continued emphasis should be placed upon assisting these students in identifying their occupational goals, and providing instructional programs in agriculture which will assist them in developing the competencies needed to perform the occupations which they have selected. Vocational agriculture will place a vital role in meeting the educational and occupational needs of these students who plan to enter the world of work upon graduation from high school.

The results of this study revealed that significant differences in selected factors related to the educational plans of these students to exist when students responses to these factors are grouped according to the following:

Group 1 - Students who planned to attend a postsecondary area vocational school.

Group 2 - Students who planned to attend a four-year college or university.

Group 3 - Students who planned to enter the world of work.

Secondary and postsecondary educators should consider these differences in individual and group guidance and in planning and maintaining programs of agriculture which will provide students with skills needed for entry and advancement in the many increasingly important and complex occupations in agriculture.

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DEVELOPMENT OF A STATEWIDE SYSTEM FOR FOLLOW-UP OF VOCATIONAL GRADUATES THAT HAS IMPLEMENTATION FOR USAGE BY LOCAL EDUCATIONAL AGENCIES

William B. Richardson[3]
Jeff Moss[4]

Introduction

Despite the enrollment growth during the past ten years in all levels of education and evidence to support more concentration of time, effort and resources in preparing students for employment, there remains unanswered questions on meeting the training and occupational needs of all students. A great majority of youth step off the educational ladder with varying degrees of ability, educational attainment, and/or occupational preparation to some rung on the occupational ladder. Whatever the level of schooling at which this transition from school to work occurs, the individual's readiness and opportunity to find satisfactory employment is important in maintaining his self-respect and dignity as an individual. It is vital, therefore, that educational planners explore and identify the expanded services schools must provide for graduates and non-graduates at the secondary and post-secondary levels. Providing a meaningful transition into the world of work is a challenge facing both educators and the business community.

Comprehensive guidance programs with services in placement and follow-up must be improved considering a cost-effectiveness approach. No coordinated effort has been made in Indiana to establish an effective placement and follow-up program using a cost-effectiveness system for local educational agencies on a coordinated statewide basis. Also, there are neither trained personnel nor an organized system for training such persons for a comprehensive service of placement.

An important element of the comprehensive guidance, counseling, placement, and follow-up system is a systematic method for following up former vocational students.

Objectives

The purpose of this study was to identify and test instruments, methodologies, and analyses for providing feedback relative to the performance of vocational graduates in the labor market. The problem resulted from a need for local and statewide data collection for summary and interpretation. The following objectives were developed:

1. To identify instruments that could be utilized to obtain follow-up information of vocational graduates.
2. To develop a methodology that could be used to obtain follow-up information of vocational graduates.
3. To field test the instrument and methodology for data collection on sample schools.
4. To develop a method for summarizing and analyzing data that could be used by both local and state agencies.
5. To provide a system for interpretation of the data to insure usage of the data at local levels in addition to usage at statewide levels.
6. To train local vocational guidance personnel to use the system.

Procedures

This project required input from several segments of vocational education in Indiana. An advisory committee, consisting of vocational educators at all levels, was formed to provide guidance for the project staff in the formation of the instrument and data collection methodologies.

The project staff, with the input of this committee, prepared a basic research instrument or instruments and a suggested methodology. To secure usability of these items a pre-field test was conducted. The purpose of this field test was to collect a small sample of data to: 1) determine the usability of the instrument and the methodology for collecting data; 2) provide preliminary data for development of computer analysis and trial data for the other objectives of the project.

The advisory committee examined the pre-test data and assisted the project staff in developing a final instrument and methodology. Likewise, the advisory committee reviewed the preliminary summary data and computer analysis for content and usability.

Once the instrument and methodology were refined, a formal field test was conducted in four selected schools that represent: 1) small to large in size, 2) rural to urban in clientele served, 3) comprehensive vocational programming, 4) geographic dispersion in state.

The data obtained via the field test used to revise the instruments and methodology. The field test data were used to develop computer printouts to provide feedback relative to local schools and statewide summaries.

Perceptions of job performance and the quality of the vocational training as assessed by the student were sought. To establish the reliability of the student's assesment of his performance on-the-job as well as the accuracy of his perception of the quality of his vocational preparation by an unobtrusive means, a small sample (10%) of supervisors of the vocational graduates in the sample were interviewed to determine the quality of performance of the vocationally trained worker.

Similarly, students' perception of guidance and assistance with placement was secured. A personal interview with the guidance and counseling personnel in the field test schools was conducted to estimate the reliability of the students' perception with the counselors' perception of this factor.

Field test data from the formal field test were used to develop an analysis system that will yield a computer printout that can be given to each school participating in the follow-up. A handbook will be developed to provide an interpretation of the data.

Results

System For Implementing Review and Follow-Up (SIRF)

The Follow-Up Model. The project staff with input from the advisory committee and the results of the field testing developed and refined the follow-up model. Presented in Figure 1 is a schematic which depicts the the components and sequential steps of the model.

FIGURE I

The model contains four basic features: 1) A student data storage system; 2) The basic procedure for collecting follow-up data; 3) Supplemental procedure for obtaining follow-up data; and 4) Reporting results of data collecting.

The Student Data Storage System. Three forms were developed for the student data storage system. Form A (Enrollment Data), which is to be completed by all students as a part of the enrollment process, is concerned with students' information such as permanent address and phone number, names of parents or guardians, program of study, and so forth. Form B (Change of Status), which is to be completed by a counselor or other institutional representative, has the purpose of updating information on the student's current status in school. Form C (Exit Form), which is to be completed by the student when the change of status involves termination, is designed to provide a final update of the information collected on the student.

Data Collection. An instrument of collecting follow-up data was developed by the research staff after having been field-tested and revised using the input of practitioners in the field. This instrument contains the basic data needed by local school personnel in obtaining feedback relative to their vocational training program. The questions on the instrument are the basis for the computer summary tables.

Data Analysis. The final phase of the follow-up model includes a computerized analysis of the questionnaires and the generation of the tables which summarize the results. A total of nine basic tables were developed, which are: 1) Identifying Information; 2) High School Statistics; 3) Mobility; 4) Employment Status; 5) Finding Employment; 6) First Job; 7) Latest Job; 8) High School Guidance; and 9) Vocational Program.

Counselor Follow-Up.

The counselor follow-up and resulting questionnaire were designed to provide supplemental data that could be compared with the information obtained from the former students. The counselor questionnaire is composed of three major sections. The first part is designed to gather data on the individual school. The second part solicits information on the guidance department at the school. The third part is designed to gather basic information on the background and training of the counselor completing the questionnaire (interview), his or her perceptions of what influences students to go into vocational education programs, his or her personal perception of how much assistance vocational education students receive from guidance services, and his or her perceptions of how graduates obtained their first jobs.

Employer Follow-Up

This aspect of the system will establish the reliability of the former student's assessment of his performance on-the-job and the accuracy of his perception of the quality of vocational preparation when employed in a related position. In addition, the employer's opinion of vocational education courses can be determined. Employee understanding and work training are also rated by the employer.

The Employment Follow-Up of Indiana Vocational Students Form is used for the employer follow-up.

Summary

This project sought to develop a systematic approach to the follow-up of former vocational students. The project developed three major elements: 1) A Student Follow-Up Model; 2) A Counselor Follow-Up Model; and 3) An Employer Follow-Up Model.

The student model was the heart of the development activities. The model consists of: 1) a Student data storage component; 2) a data collection component; 3) a data analysis component; and 4) an interpretation and summary component. The primary concern of this system is a practical simplistic, systematic approach to the follow-up of former vocational students.

The counselor follow-up consists of an instrument to obtain information about the counseling and placement activities.

The employer follow-up provides for feedback from the employer relative to the preparation for work and the work habits of the student.

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FACTORS INFLUENCING NINTH- AND TENTH-GRADE VOCATIONAL AGRICULTURE ENROLLMENT DECISIONS AND LEVEL OF COMPETENCY OF STUDENTS ENTERING AREA VOCATIONAL CENTERS

Larry D. Householder [5]

Purpose

The major questions investigated are:

1. What personal and situational variables influence students' decisions to enroll or not to enroll in the ninth- and tenth-grade vocational agriculture program when such a program is offered at the high school?
2. What personal and situational variables are related to the level of competency in the basic principles of agriculture displayed by students who could but did not enroll in ninth- and tenth-grade vocational agricutlure?
3. What personal and situational variables are related to the level of competency in the basic principles of agriculture displayed by students who enrolled in ninth- and tenth-grade vocational agriculture?
4. What school and community activities are related to the level of competency in the basic principles of agriculture displayed by students entering area vocational centers?

Procedures

Personal and situational data as well as results of criterion-referenced tests in the areas of agricultural occupations, leadership, animal science, crop and soil science, and agricultural mechanics were utilized in this investigation.

Of the 607 students who had been enrolled in high schools offering vocational agriculture in grade 9 and 10, 82 per cent were boys while the remaining 18 per cent were girls. Other personal variables utilized in this study included:

1. Whether or not the student indicated an occupational choice when entering the area vocational center.
2. The person with the most influence on the student's decisions to enroll in the area vocational center.
3. Education plans after high school.
4. Reason for attending the area vocational center.

The situational variables included: place of residence; father's and mother's occupational category; school activities; total number of school activities; community activities; total number of community activities; FFA activities of vocational agriculture enrollees; and supervised occupational experience programs of vocational agriculture enrollees.

Findings

Enrollment Decisions

Results of a stepwise multiple regression analysis indicated that place of residence; sex; number of school activities; participation in varsity sports, band or glee club, school newspaper, GAA, class offices and 4-H club; indication of occupational choice; and father's occupational category were significant variables in explaining the variance in student enrollment decisions. The variables as a group explained approximately 53 per cent of the variance in student enrollment decisions.

In a canonical correlation analysis, using a value of 0.30 as the required level for significance when interpreting the canonical correlations, place of residence, sex, 4-H club membership, and father's occupational category were found to be significant variables.

Factors Related to Non-Enrollee's Level of Competency

Sex, education plans after high school, father's occupational category, band or glee club membership, being an officer in the student council, membership in a church organization, and 4-H club membership were found to be significant variables in explaining the non-enrollee's level of competency. The variables as a group, accounted for 27 per cent of the variance in the scores on the basic principles of agriculture test made by students who did not enroll in vocational agriculture programs in grades 9 and 10 although the program was offered.

From observing the correlation coefficients, it is evident that males tended to perform better on the principles test as well as did those students whose fathers were employed in production agriculture or related fields. It was surprising that holding an officer's position in the student council tended to have a negative influence on the student's performance on the principles test.

Factors Related to Enrollee's Level of Competency

Place of residence, indication of occupational choice, being an officer in a church organization, being an officer of Junior Achievement, other community activities, enrollment in a work study program, FFA membership, and number of FFA contests and awards were found to be significantly related to the level of competency in the basic principles of agriculture of students previously enrolled in vocational agriculture in grades 9 and 10. These variables, as a group, accounted for approximately 34 per cent of the variance in the students' scores on the principles tests.

FFA membership and activities as well as place of residence contributed significantly to level of competency while enrollment in a work study program and being an officer of Junior Achievement and a church organization tended to influence scores on the test negatively.

Relationship Between School and Community Activities and Level of Competency

For enrollees in ninth- and tenth-grade vocational agriculture, the significant variables were: FFA membership, being officer of Junior Achievement, being officer of 4-H club, and being officer of a number of community activities. These variables collectively accounted for approximately 24 per cent of the variance in the enrollees' scores on the principles test.

For nonenrollees, FHA participation, 4-H club membership, and science club membership were significant variables, which collectively accounted for 13 per cent of the variance in the students' scores on the principles test. FHA participation had negative influence while 4-H club and science club memberships had positive influence on students' scores.

Summary

The primary emphasis in this investigation was to explain those factors which tend to influence students' enrollment decisions concerning vocational agriculture in grades 9 and 10 as well as those factors which influence the student's level of competency in the basic principles of agriculture upon enrollment in an area vocational center.

It appears that the primary factors which influence students' decisions to enroll or not enroll in vocational agriculture in grades 9 and 10 are traditional ones. As of the beginning of the 1973 school year, findings indicate that those students entering specialized vocational agriculture programs with previous enrollment in vocational agriculture would tend to be males who reside on farms or in the country who had 4-H club experience, and whose fathers were employed in production agriculture or related occupations.

This seems to indicate a need for a continued effort to change the stereotype of vocational agriculture as primarily a program for rural males interested in farming. In addition, career education activities in elementary and junior high schools that provide awareness and exploration activities in agriculture and agricutlure-related occupations would be helpful. Vocational agriculture teachers with ninth- and tenth-grade programs should make extensive efforts to familiarize elementary, junior high, and senior high school students, teachers, administrators, and guidance counselors of the pruposes and content of their program. These persons should also be informed of the types of students in addition to those meeting the stereotype who could profit from vocational agriculture in grades 9 and 10.

In reference to level of competency in the basic principles of agriculture, nonenrollees' scores were influenced by variables indicating direct contact with agriculture (4-H member and father's occupation) and higher education aspirations. Concurrently, the enrollees' levels of competency were influenced more by FFA membership and activities, farm and country residence, and definite occupational choices. In both cases students with more agricultural awareness and exploration opportunities as well as better defined educational or occupational aspirations tended to perform higher on the competency tests.

When school and community activities were considered alone in relation to the students' competencies in the basic principles of agriculture, again FFA and 4-H club activities were important. For enrollees, participation in additional community activities seemed particularly important in relation to their competencies. Perhaps this is due to involvement in agriculture-related organizations and activities in their communities.

This investigation also has some implications for persons actively involved in program and policy development in agricultural education such as teacher educators and state supervisors. Perhaps renewed efforts should be made to promote ninth- and tenth-grade vocational agriculture programs which are appealing to all types of students rather than only to students fitting the traditional stereotype. If one of the purposes of the ninth- and tenth-grade program is to provide career exploration activities in agriculture, curriculum modifications may be necessary. In addition, teachers must be prepared to provide opportunities for students with diverse occupational goals in agriculture to develop the basic competencies necessary for further study.

If ninth- and tenth-grade vocational agriculture programs are considered essential for the development of basic agricultural competencies, should enrollment in such a program be considered a prerequisite for entry into specialized vocational agriculture programs in the eleventh- and twelfth-grades? Perhaps this is an area in which further research is needed.

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DETERMINATION OF A COMMON CORE OF BASIC SKILLS FOR VOCATIONAL AGRICULTURE INSTRUCTION

J. David McCracken[6]

Basic skills traditionally taught in high school vocational agriculture programs have been those relating to animal science, plant and soil science, agricultural mechanization, farm and business management, leadership, and career opportunities. Decisions regarding the specific skills to be taught have generally been made based upon advisory committee input, task inventories, and/or community surveys. Vocational educators have tended to approach the selection of curriculum content with the identification of competencies required in specific occupations.

The field of agriculture has been broad. There were so many enterprise areas which could have been taught that some mechanism was needed for determining the relative importance of potential curriculum content.

A project was designed and conducted with the following primary outcomes:

1. An initial inventory of tasks performed by workers in 28 selected occupations representing all major areas of agriculture/agribusiness.
2. An occupational survey report of tasks performed by workers in each of the selected occupations.
3. Tasks common to all occupations, identified by analysis of data.
4. Recommendations for using the common tasks in curriculum revision and evaluation, and in career orientation and exploration.

An important secondary outcome was the 28 completed task inventories for 28 representative agricultural occupations. The 28 occupations selected by the state advisory committee to the project follow:

Agricultural Production

1. Dairy farmer
2. Swine farmer
3. Beef farmer
4. Horse farm hand
5. Cash grain farmer
6. Forage producer
7. Commercial vegetable grower
8. Farm manager

Agricultural Business, Supply, and Service

9. Feed salesman
10. Feed mill helper - mill worker
11. Bulk fertilizer plant worker
12. Chemical application equipment operator
13. Animal care assistant

Agricultural-Industrial Equipment and Service

14. Agricultural-Industrial equipment mechanic
15. Agricultural-Industrial equipment set-up and delivery man
16. Agricultural-Industrial equipment parts man

Horticulture

17. Tree service worker
18. Floral designer
19. Greenhouse worker
20. Nursery salesman
21. Horticultural firm equipment mechanic

Agricultural Resources Conservation

22. Park worker
23. Building and grounds foreman
24. Soil conservation aide

Forestry

25. Sawmill worker
26. Timber harvest worker (all-round logger)

Agricultural Products Processing

27. Meat cutter
28. Dairy plant worker

Methodology

The procedures for the project were similar to those suggested by Melching and Borcher in a publication of the Center for Vocational Education at the The Ohio State University.

An initial task inventory for each of 28 occupations was constructed from activity and task statements in available published source materials and from discussions with representatives from the occupational area. The major duties of the occupation and the tasks required to support each duty area were listed. The initial list was reviewed by at least 10 incumbents in each occupation. Following a final edit, the inventories were printed for use in conducting occupational surveys.

Workers in 28 occupations were surveyed to seek answers to two questions:

1. Does the incumbent perform the task?
2. What is the importance of this task to successful performance in the occupation?

A population of workers was identified for each of the 28 occupations. For most occupations, an approximate sample size of 100 incumbents was drawn. An initial mailing and a follow-up mailing was conducted.

Data were keypunched and analyzed using the SOUPAC computer program. Priority ratings within occupations were assigned to tasks based upon the percentage of incumbents performing the task and the mean rating of importance assigned to task by incumbents. Priority ratings were then assigned by calculating mean ratings across occupations.

Findings

The findings of the project can be grouped into three major categories. The three are those: 1) relating to each of the 28 agricultural occupations, 2) relating to the common tasks within each of four taxonomies, and 3) relating to the common tasks across the 28 occupations.

The 28 Agricultural Occupations

Individual reports have been prepared for each of the 28 agricultural occupations. The sample is described and priority ratings for task statements are presented.

The description of the sample relates the number and per cent response to the survey, the size of the firms where employed, total work experience of respondents, length of tenure in current job, and preparation for the occupation. This will enable other states desiring to use the findings to compare their sample of workers with those in this study to determine if this data might be valid in that situation.

Task statements grouped by duty area were presented in table form (see Table 1). A table presented the per cent of respondents performing each task and the average rating of importance of each task by respondent. For most occupations, a mean importance rating of 2.3 or less would indicate low priority for inclusion of the task in the curriculum.

TABLE I*

PERCENTAGE PERFORMANCE AND AVERAGE RATING OF IMPORTANCE
OF SPECIFIC TASKS
FOR THE OCCUPATION OF MEAT CUTTER

	Percent Performing	Average Level of Importance
Refrigerating and Storing Meats		
Control temperature in storage areas . .	97	2.9
Determine freezer storage life of various meats	92	2.7
Evaluate influence temperature, humidity and air circulation have on longivity of meat	92	2.8

Handle carcasses in the cooler	63	2.2
Handle retail meat in the cooler	86	2.7
Quick freeze meats for customers	52	1.7
Read thermometers in storage areas	94	2.8
Recognize signs of meat spoilage	92	2.9
Rotate meats on a first-in first-out basis	94	2.9
Mean Rating	83.8	2.6

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*The data in Table I wereextracted from the original. Table I lists the 10 tasks from one duty area. The original table contained 20 duty areas. A table has been prepared for each of 28 occupations.

Common Tasks Within Each of Four Taxonomies

Enough occupations were analyzed in the taxonomies of agricultural production; agricultural business, supply and service; agricultural-industrial equipment and service; and horticulture to examine the tasks which were common to the taxonomy. With the help of the state and natioal advisory committees to the project, criteria were developed for identifying the common tasks within taxonomies. It was determined that tasks having a 2.3 or higher mean importance rating in one-half of the occupations in the taxonomy would become the "common core of basic skills" in that occupational area. Come occupations were re-examined to determine if they were listed in the correct classification. The committees recommended that the horticultural firm equipment mechanic be moved to the agricultural-industrial equipment and service taxonomy for this phase of the analysis. The animal care assistant was dropped from the agricultural business, supply and service taxonomy.

Table II presents the common tasks for the agricultural-industrial equipment and service taxonomy for the duty area of Using Technical Publications.

TABLE II*

MEAN IMPORTANCE RATING OF SPECIFIC TASKS COMMON TO THE AGRICULTURAL-INDUSTRIAL EQUIPMENT AND SERVICE TAXONOMY

TASK STATEMENTS	Occupation			
	Mechanic	Set-up & Deliveryman	Parts Man	Hort. Firm Equip. Mech.
Using Technical Publications				
Locate specifications for equipment	3.0	2.5	2.4	3.0
Locate appropriate manuals for equipment . . .	2.9	2.5	2.6	3.0
Interpret sketches, figures, and descriptions in manuals	2.8	2.8	2.7	2.9
Follow written repair procedures	2.9	-	-	2.9

*The data in Table II were extracted from the original complete table. Table II lists the four common tasks from one small duty area. The original table contained 24 duty area. A table has been prepared for each of four agricultural taxonomies.

It may be of interest to you that the common tasks in agricultural production are those in farm management and agricultural mechanics. A separate commonality analysis is being conducted for livestock occupations and for cropping occupations.

Common Tasks Across 28 Occupations

The state and national advisory committees assisted the project staff in developing and testing criteria for selecting tasks common across the 28 agricultural occupations. They recommended that tasks be part of a "common core of basic skills" if they were rated 2.3 or higher on the mean importance rating in one-half (14) of the occupations. Very few tasks were found to be common across the occupations. Those that were found to be common were non-agricultural in nature (e.g. use telephone, identify potential safety hazards, identify tools, etc.).

Closing Remarks

It appears that these data support the recent trend in agricultural education towards specialized program offerings. Schools attempting to offer training for all agricultural occupations will find their task difficult, if not impossible.

Agricultural Educators have historically based their instruction on problems existing in the occupational experience of students. These types of studies yield data which provide empirical support for relevant instructional programs. Our challenge is to use these data to encourage the needed improvement in instructional programs.

I would like to close with a word of caution. This approach to curriculum building results in content based upon existing required skills. Emerging needs must be identified and added to the curriculum by local teachers if students are to be properly prepared for employment.

The complete report of this project will be printed in September of this year. Copies will be made available to each teacher education institution and state department of education at that time.

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A COMPARISON OF AGRICULTURAL EDUCATION STUDENTS AND STUDENTS IN OTHER AGRICULTURAL CURRICULA AND FACTORS RELATED TO THEIR CURRICULUM CHOICE

Carl L. Reynolds[7]

Background

Although considerable efforts have been made to recruit students in agricultural education, the supply of qualified graduates who will accept a teaching position is insufficient to meet the demand. To make recruitment efforts more effective, more information than is currently available is needed on the characteristics of the current students in agricultural education curriculum and on students enrolled in other curricula in agriculture.

In order to improve recruitment efforts, the process and factors involved in curriculum and occupational choice must be considered. A close similarity exists among factors associated with curriculum and occupational choice. Occupational choice has been considered as a developmental process. Many factors have been identified, which influence the agriculture college student's curriculum and occupational choice.

Statement of the Problem

Results of past studies indicate that more information is needed on the factors which influence curriculum choice and the time when that choice is made. To be effective, a recruitment program must include factors about which something can be done. The program should increase the student's knowledge about the occupation and the training required for qualification, and should also improve his perception of the occupation.

Answers to the following questions will be sought in this study to provide a basis for an effective recruitment program:

1. What are the differences in personal characteristics between students who elect the agricultural education curriculum and students who elect other agricultural curriculum?
2. What relationship exists between students' amount of work experience and curriculum choice?
3. How will students assess selected factors that may have influenced them in their curriculum choice?
4. What job values do agricultural education majors consider important?
5. What are the students' perceptions of teaching agriculture as a career?
6. Of those students with a farm background, what relationship exists between their assessment of the opportunity to become established in farming and their curriculum choice?
7. What are the students' perceptions of the agriculture teacher?
8. What are the students' perceptions of the high school teacher and agriculture teacher job market?
9. How will students at various grade levels assess the factors which may have influenced their curriculum choice?
10. At what time did students in agricultural education and students in other agricultural curricula make their curriculum choice?

Execution of the Study

Population

The total population of students enrolled in the agricultural education curriculum at the University of Illinois and Illinois State University will be included in this study. A random sample of students in other agricultural curricula from the two institutions will be included. The number of students selected in the random sample will be the same as the number of students sampled in the agricultural education curriculum. It is estimated that 200 students will be included in the study.

Data Collection and Instrumentation

Data needed for the study will be collected by administering a questionnaire to the selected students.

The questionnaire will be developed in accordance with the operational definitions of the variables considered in the study.

The independent variables are: age; sex; year in college; place of residence; size of home high school; father's occupation; farm experience; vocational agriculture experience; FFA experience; amount of related work experience; assessment of selected influencing factors on curriculum choice; rating of benefits derived from a job; opportunity to become established in farming; perceptions of agriculture teachers; perceptions of the teacher job market; perceptions of the agriculture teacher job market; perceptions of teaching agriculture as an occupation and time of curriculum choice.

The dependent variable is curriculum choice. Students will be grouped. into two categories; (1) those who have chosen or who plan to choose agricultural education, and (2) all other students who have chosen or who plan to choose other agricultural curricula.

Except for some of the demographic data, items on the questionnaire will be developed for which a Likert scale of measurement can be used.

A pilot study will be conducted, in which the preliminary instrument will be administered to a sample of senior students in the College of Agriculture at the University of Illinois to test the reliability, validity and discriminating power of the instrument.

Research Design

The characteristics of the two groups of students, agricultural education majors and other agricultural curriculum majors, will be compared in this study. Additional subgroups will be compared using class status as the criterion. The design is expressed graphically as follows:

C_1			Y_1		O_1
C_2			Y_1		O_2
C_1			Y_2		O_3
C_2			Y_2		O_4
C_1			Y_3		O_5
C_2			Y_3		O_6
C_1			Y_4		O_7
C_2			Y_4		O_8

The symbols in the design model represent the following groups in this study:

C_1 - Agricultural education majors

C_2 - Other Agricultural curriculum majors

Y_1, Y_2, $_3$, Y_4 - Freshmen, Sophomores, Juniors, and Seniors in the College of Agriculture, respectively

O_1 - O_8 - Demographic data and perceptions of agriculture college students

Data Analysis

The hypotheses to be tested are:

1. There is a significant difference in the demographic and personal characteristics of agricultural education majors and students in other agricultural curricula. These characteristics are: Age, sex, place of residence, size of home high school, vocational agriculture experience, FFA experience, and farm experience.

2. There is a significant difference in the amount of related work experience obtained by agricultural education majors and students in other agricultural curricula.

3. There is a significant difference between agricultural education majors and students in other agricultural curricula in their assessment of selected factors which influence curriculum choice.

4. There is a significant difference between agricultural education majors and students in other agricultural curricula in their rating of benefits derived from a job.

5. Agricultural education majors perceive the teaching of agriculture as being a more desirable occupation than do students in other agricultural curricula.

6. Of those students who identify place of residence as being rural-farm, there is a significant difference between agricultural education majors and students in other agricultural curricula in their assessment of opportunities to become established in farming.

7. Agricultural education majors perceive the agriculture teacher more favorably than do students in other agricultural curricula.

8. There is a significant difference between agricultural education majors and students in other agricultural curricula in their perceptions of the teacher job market.

9. Agricultural education majors have a more accurate perception of the agriculture teacher market than do students in other agricultural curricula.

10. With increasing years of college attendance, students place higher emphasis on the influence of their college advisor, a college instructor, and courses taken in college and less emphasis on the influence of their high school teacher, high school counselor, and courses taken in high school.

11. There is a significant difference between agricultural education majors and students in other agricultural curricula in the time at which curriculum choice was made.

Analysis of variance and chi-square statistic will be used to test these hypotheses.

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DEVELOPMENT OF INSTRUCTIONAL MATERIALS FOR USE BY INDIANA VOCATIONAL TEACHERS IN TEACHING LEADERSHIP AND CHARACTER DEVELOPMENT TO YOUTH IN INDIANA

David L. Howell[8]
William B. Richardson[9]

Introduction

Sidney P. Marland, U. S. Commissioner of Education, recently noted that a singleness of purpose has marked the history of vocational youth organizations, namely encouraging leadership and good citizenship in young people. The National Advisory Council on Vocational Education emphasized the need for increased support of vocational youth organizations in its Seventh Annual Report to the Department of Health, Education, and Welfare. The State of Indiana cites "leadership development activities" and "improved instruction" as goals for its vocational youth organizations in 1974. Thus, research and development activities directed toward developing instructional materials designed to facilitate leadership and character development in vocational education students constitute a realistic step toward achieving these goals.

The overall rationale of the proposed research is to provide instructional materials that are specially suited and designed for use by Indiana vocational education teachers to develop leadership and character in vocational education students. At the same time, it is important to plan for the teacher's use or implementation of the materials developed. Therefore, a major emphasis of the proposed research will be to coordinate materials development with a plan for materials implementation in teaching. The plan for implementation of materials is called "the three-stage model of learning." Basically, the model provides for a knowledge-acquisition stage (stage 1), a knowledge-application stage (stage 2), and a knowledge-interpretation-synthesis and personal relevance stage (stage 3).

Statement of the Problem

The goal of this reasearch was to develop instructional materials for use by vocational education teachers in teaching leadership and character development to youth in Indiana. Careful consideration of this goal reveals that there are actually two important factors that make up the goal. The first factor is the more obvious one and concerns the actual development of instructional materials designed to teach leadership and character development. The second factor is less obvious, but equally important, and concerns the teacher's use or implementation of the materials developed. If the materials do not provide for the involvement and interest of the teacher, then it is likely that the materials will receive limited and ineffectual use. The aim of this research is to generate a unified treatment of these two important factors.

Objectives of the Project

1. Identify leadership skills and character traits that are important for vocational students via a task analysis based on consultant recommendations and review of the literature.
2. Categorize these skills into topical areas for which three-stage learning packages will be developed.
3. Search the current literature for existing instructional materials that can be used or adapted for stage one, the knowledge-acquisition stage, for each topic area.
4. Search the current literature for existing simulation materials that can be used or adapted for stage two, the knowledge-application stage, for each topic area.

5. Search the literature for methods and procedures that can be used or adapted for stage three, learning experiences, namely individual interpretive, synthesizing and personal involvement activities.

6. Develop a teacher manual for each of the three-stage packages.

7. Pilot test the materials in local schools and revise as needed.

8. Conduct a formal field-test of the materials.

These objectives are designed to insure the attainment of coordinated materials development and implementation, the goal given in the statement of the problem.

Procedures of Implementation

The objectives of the project will be achieved through the following nine steps:

1. Identify leadership skills and character traits important for vocational students.
2. Categorize these skills into topical areas.
3. Identify existing instructional materials suitable for stage one.
4. Identify existing simulation materials suitable for stage two.
5. Identify methods and procedures suitable for stage three.
6. Develop a teacher manual for each three-stage training package.
7. Pilot test materials in local schools and revise materials.
8. Formally field test the materials.
9. Final revision of materials.

Results

The task analysis revealed in excess of 100 specific skills deemed necessary for vocational youth leaders. The consulting committee assisted in verifying these skills. The project staff chunked these skills into a logical order. A series of thirteen units resulted. The consulting committee again was asked to verify the units. The thirteen topics which were the basis for the development of the units are: (1) Introduction to Leadership; (2) Planning and Initiating; (3) Parliamentary Procedure; (4) Developing Group Goals; (5) Levels of Leadership in a Group; (6) Skills of a Group Leader; (7) Personal Characteristics of a Group Leader; (8) Skills of a Group Member; (9) Developing Group Cohesiveness; (10) Effective Committee; (11) Communication Skills; (12) Internal Operations of a Group; and (13) Outcomes of Leadership.

The use of a three-stage training package can be described as follows:

Stage One

Students are given a Self-Instructional Guide (SIG) in Stage One to direct their learning activities. The SIG gives an introduction, states the objectives, specifies the learning activities, and offers self-quiz questions.

Included with the SIG is a Basic Information Summary (BIS). The BIS is a three-to-five page reading designed to teach the objectives stated in the SIG. Additional readings are provided in this manual and can be circulated among students.

When students have finished the BIS and any additional instructional activities specified in the SIG, they respond to the self-quiz questions and receive a self-quiz feedback sheet from the teacher. When they are satisfied with their performance, they take a mastery quiz to ascertain whether or not they have mastered the basic information provided in Stage One.

Stage Two

Group work is directed by a Group Instructional Guide (GIG). The GIG provides an introduction, states the objectives, and specifies the learning activities. As was in the case of Stage One, a Basic Information Summary

(BIS) is supplied to the students. The BIS includes specific directions on how to perform the group simulation or project. The simulation is designed to involve the application of the definitions of leadership learned in Stage One.

In Stage Two, the class is organized into small groups and the students have an opportunity to cooperate and learn from one another and are also prepared for Stage Three.

Stage Three

Individual work in Stage Three is directed by a document called Procedures for Individual Project (PIP). The PIP states the objectives and specifies the instructional activities. Occasionally a BIS will accompany a PIP in which case the BIS specifies the directions for accomplishing the individual activity. The student is expected to accomplish the individual project outside of class as homework. The instructional activity in the PIP is always designed to develop the individual student's interests and abilities. Completion of the PIP marks the end of a unit of instruction.

The materials are organized into a teacher's manual and a student manual. The teacher's manual contains all the basic documents plus pre-test, mastery test, answers to the self-quizzes, and additional readings. The student manual contains only the SIGs, GIGs, PIP, BIB, and essential readings.

Summary

This developmental model has sought to provide quality instructional materials for use by local teachers in teaching leadership and character development to Indiana vocational youth.

The materials were developed utilizing a three-stage learning model which was designed to provide individual and group participation in a series of thirteen units of instruction.

The explicit outcome of this project is to enhance the comprehensive leadership skills in vocational students and increase the quality of vocational instruction.

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EFFECTS OF CLASS TIME, PRACTICE TIME, AND TEACHING METHODS UPON COGNITIVE AND PSYCHOMOTOR SKILL ACHIEVEMENT IN TEACHING SMALL GAS ENGINES

William W. Bushmeyer, Jr.[10]

Introduction

Mechanical skills acquired in agricultural mechanics courses taught in secondary, area vocational-technical schools, and colleges should be both cognitive and psychomotor oriented. These demands have placed educators in agricultural mechanization with the responsibility of selecting the appropriate teaching methods, which provide adequate psychomotor skill training.

With the demand for improvement of skill training and the limited time of the teacher in performing his teaching responsibilities, the need existed for improved methods to enable the teacher to take full advantage of his facilities in developing the proper learning sequence in teaching psychomotor skills. Research was needed to determine more effective methods of teaching psychomotor skills in secondary and post-secondary agricultural mechanics programs.

General Design of the Study

The purpose of the study was to determine the effects of three teaching methods upon the cognitive and psychomotor skill achievement in small gas engine ignition systems when the ratio of classroom and shop instruction was varied.

The 3 x 3 factorial design was utilized to investigate two independent variables, each varied in three ways. The first independent variable was the different teaching methods T_1, T_2, and T_3. T_1 was designated as the lecture-demonstration method. T_2 was designated as the behavioral objective-demonstration method, and T_3 was designated as the audio-visual-demonstration method.

The second independent variable was the different time ratio of class instruction to laboratory practice time, R_1, R_2, and R_3. R_1 was designated as 25 percent class instruction to 75 percent laboratory time. R_2 was designated as 50 percent class instruction to 50 percent laboratory time. R_3 was designated as 75 percent class instruction to 25 percent laboratory time.

The first dependent variable was the gain scores between the pretest and posttest administered by the teacher on small gas engine ignition systems before and after the experiment was conducted.

The second dependent variable was the scores on the psychomotor ignition skill test administered by the teacher and performed by each individual student at the end of the experimental period.

The population consisted of 101 Missouri vocational agriculture students who were enrolled in semester courses of small gas engines offered in the Central Missouri State University 21-county district during the winter semester of the 1973-1974 school year. A total of nine vocational agriculture teachers who planned to teach the semester course in small gas engines during the winter semester of 1973-1974 school year agreed to participate in the study. The duration of the study was eight consecutive 55-minute periods.

Analysis of covariance was utilized to test the hypothesis related to teaching methods and time ratios in cognitive and psychomotive skill achievement. If the assumptions of analysis of covariance were not met, then analysis of variance was utilized in this study. Statistical values at the p.05 level were considered sufficient to reject the null hypotheses.

The following null hypotheses were tested:

HO_1: There was no significant difference in cognitive achievement as the result of the different methods of teaching.

HO_2: There was no significant difference in motor skill achievement as a result of the different methods of teaching.

HO_3: There was no significant difference in cognitive achievement as a result of the treatments utilizing various time ratios.

HO_4: There was no significant difference in motor skill achievement as a result of the treatments utilizing various time ratios.

HO_5: There was no significant interaction between the two independent variables.

Summary of the Findings

The three teaching methods T_1, T_2, and T_3 significantly affected both cognitive achievement and psychomotor skill achievement. The three time ratios R_1, R_2, and R_3 significantly affected both cognitive achievement and psychomotor skill achievement. The interactions between three teaching methods and three time ratios significantly affected both cognitive achievement and psychomotor achievement.

As shown in Figure 1, treatments T_1R_2 and T_2R_3 were equivalent in maximizing cognitive achievement, gain score; treatment T_2R_3 was superior to treatment T_3R_2, and treatment T_1R_2 was superior to treatment T_3R_2 for maximizing gain score achievement.

As shown in Figure 2, treatment T_2R_3 was superior to treatment T_1R_1; treatment T_2R_3 was equivalent to treatment T_1R_2 in teaching psychomotor skills.

Conclusions

Statistical analysis of these data resulting from this research provided the basis for the following conclusions:

1. The teaching method and time ratio utilized in the proper proportion will affect the cognitive achievement, gain score, of students.

2. The behavioral objective method (T_2) was superior the the audio-visual method (T_3) in maximizing cognitive achievement, gain score.

3. The lecture method (T_1) was superior the the audio-visual method (T_3) in maximizing cognitive achievement, gain score.

4. The lecture method (T_1), with a time ratio of 50/50 was found to be equivalent to the behavioral objective method (T_2), with a time ratio of 75/25 in maximizing cognitive achievement, gain score.

5. The teaching method and time ratio utilized in proper proportion will affect the psychomotor skill achievement of students.

6. The behavioral objective method (T_2), with a time ratio of 75/25 was found to be superior to a time ratio of 25/75 in maximizing psychomotor skill achievement.

7. The behavioral objective method (T_2), with a time ratio of 75/25 was found to be equivalent to the lecture method (T_1), with a time ratio of 50/50 in maximizing psychomotor skill achievement.

8. The lecture method (T_1), with a time ratio of 50/50 was found to be equivalent to the audio-visual method (T_3), with a time ratio of 50/50 in maximizing psychomotor skill achievement.

The findings of this study indicated the use of behavioral objectives, with 25 percent shop instruction and the lecture method with 50 percent shop instruction were the two best methods of teaching about small gas engine ignition systems.

Recommendations

During the conduct of this 3 x 3 factorial experimental study, the following problems were identified:

1. What effect does the instructor's influence contribute to cognitive

and psychomotor skill achievement among students enrolled in agricultural mechanics courses?

2. Would replications of this study show any difference in cognitive and psychomotor skill achievement among students enrolled in small gas engine semester courses?

3. Is there any significant difference in mechanical ability among students enrolled in small gas engine semester courses in other school districts.

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THE DISSEMINATION/DIFFUSION PROCESS IN SELECTED FLORIDA SCHOOLS

James W. Hensel[11]

Introduction

Educators are generally agreed that there is need for changes in most school systems and that there is currently no adequate knowledge base regarding the means for effectively implementing these changes. Federal and state funds have encouraged innovative and exemplary programs through a variety of programs over the past ten years. Frequently, however, a "successful" innovation either dies when special support is withdrawn or the impact of the new idea is limited to the immediate district served by the project. With this picture as a background, I plan to accomplish three basic tasks in this paper:

a. to describe a research study and a technique which was utilized to examine the process of change,

b. to illustrate with one example why the technique has many challenging aspects, and

c. to break a cardinal rule of research and expand some conclusions beyond the data.

A. Description of the Florida Study

The critical need toward which this study was directed was to identify factors and strategies that seemed to cause educational innovations to be adopted or adapted in Florida schools. This study differed from most other studies of change in two respects. First, the study did not start out with a hypothesis. An attempt was made to identify interrelated and interacting institutional conditions which appeared to affect the communication and adoption of new instructional practices. It was hoped that it would be possible to generate hypotheses which could then be tested through the collection of quantitative data.

A second manner in which the study differed from other studies was in the methodolgy used. Data were collected regarding the natural history of innovations utilizing anthropological research methods of inquiry.

1. Methodology

Rogers and Shoemaker[1] have pointed out that research on change has generally used the individual as a unit of analysis. They suggested that the primary concern with individuals as units of analysis be abandoned in favor of relations between individuals as units of analysis. The study reported in this paper is consistent with this suggestion. The study sought to identify the interrelational components of a school's social system as this system interacted within its cultural context.

The natural history method of inquiry, as used in anthropological field study, provided the best available methodology for data collection in this study. Such a methodology made it possible to study and describe the social and psychological conditions associated with introducing an innovation.

The research involved 16 schools (8 elementary and 8 middle or secondary) in 4 counties (one rural, one urban, one in an area of rapid population expansion, and one surrounding a major university). In each county, two schools displaying a high degree of innovative practices and two schools displaying a lesser degree were selected for study.

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[1] Rogers, Everett M. and F. Floyd Shoemaker, Communication of Innovations: A Cross-Cultural Approach (New York, The Free Press, 1971) p. 80.

The primary method of data collection was that of the non-scheduled interview, structured in terms of the problem of learning the significant events in the introduction, implementation, continuation or discontinuation of innovations in the school setting. The techniques were designed to provide the respondent with freedom to introduce material that was not anticipated by the interviewer. Also, it allowed the interviewer to pursue avenues of questioning about significant conditions in the specific situation that were not foreseen to be important. The interviewers spent an average of eight days in each school setting.

The initial selection of a particular innovation to be studied within a school was based on such factors as the judgement of the principal and county education officials, the willingness of the principal to allow the study of the innovation, the availability of persons associated with the innovation for interviews, the opportunity to observe the innovation, the adoption of the innovation within the past five years and the time available for study in proportion to the magnitude of the innovation. Field notes were kept on each school and from these notes, detailed case studies were developed to describe the total picture surrounding the innovation within each school.

The data collected were subjected to two types of analysis. Through a series of seminars, the field researchers, under the direction of Dr. Eddy, examined the field notes and the case studies and identified institutional arrangements or conditions that appeared to be associated with the introduction of innovations in the sixteen schools. A second analysis of the data was made by Dr. Mary Kievit[2], who examined the field notes, case studies, and the list of institutional arrangements or conditions. From this examination, she developed a set of statements that could be translated into hypotheses. A selection of these statements are presented in this paper.

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[2] Dr. Mary Kievit, Professor, Department of Vocational-Technical Education, Rutgers, The State University, New Brunswick, N.J.

2. Findings

Some of the most appropriate findings have been gleaned from the study and are presented as a series of statements. The statements fall into three basic categories:

a. Statements that relate to the school as a social system

b. Statements that relate to personnel within the system, and

c. Statements that involve the general characteristics of the innovation.

a. The School as a Social System. First, an examination of those statements or critical variables that must be considered from the viewpoint of the total school as a social system. In the most innovative schools, we found the following statements to be critical:

(1) Budget allocations were directed to support specific innovations.

(2) Rewards and penalties were dispersed in relation to the contributions made toward implementing the desired changes.

Illustration: In several of the more innovative schools, teachers who experimented with new practices were given additional support in terms of supplies, lower class loads and funds for travel.

(3) Faculty members were involved at key points to facilitate change but the administrators maintained decision-making prerogatives.

(4) Opportunities were provided for in-service education for appropriate faculty.

(5) Innovative schools were more explicit in describing the nature of the change.

Illustration: Specific written materials, procedures, and objectives were provided teachers in more innovative schools.

(6) Both administrators and teachers were more frequently associated with external sources of information concerning educational practices.

(7) Internal procedures were established for on-going evaluation of achievement of system goals.

(8) A position was designated within the system as having the responsibility for stimulating change.

(9) Close supervision and assistance were provided for teachers, especially in the early stages of an innovation.

(10) The more innovative schools were more alert to state influence, policies and possible funds.

b. Personnel Within the System. The second basic category was that of the school personnel or in other words, the relationship of the innovation to the individual. The study results led us to conclude:

(1) Innovations requiring the cooperation of two or more teachers were more likely to be adopted and continued if there was a high degree of compatibility between teachers who must work closely together.

Illustration: Team teaching worked where the teachers initiated the request. Those teams that had teachers who were arbitrarily assigned failed.

(2) Innovations which were congruent with the traditional role expectations of teachers were more likely to be adopted and continued.

Illustration: Teachers were reluctant to share a classroom and increase enrollments and thus hesitated to participate in team teaching or grouping techniques.

(3) Innovations which conformed to the traditional role expectations of school administrators were more likely to be adopted and successfully continued.

Illustration: Traditionally the principal is given a considerable degree of authority to run the school and make internal decisions. In one case, county staff personnel violated the autonomy of the principal by coming into his school and setting up a special reading program. A clash of authority occurred when the county staff personnel sided with certain teachers in a dispute over the allocation of funds for the program. The county staff personnel won the battle, and the principal's authority in the school was momentarily diminished. However, the following year the teachers who had sided with the county staff were no longer in the school and the entire school reading program had been discontinued.

c. Nature of the Innovation. The third basic category which we identified in order to classify the statements was one which seemed to cut across all categories. Three statements illustrate our findings.

(1) Innovations that were congruent with the values and actions of influential parents were more likely to be adopted and continued.

Illustration: Immediately following desegregation, a group of white influential parents were upset by the fact that a black teacher was teaching a first grade class at a prestigious elementary school. First, the parents appealed to the principal, then they went to the superintendent. Subsequently, the principal received a call from the superintendent who told him to begin a first grade team and to pair the black teacher in question with a good white teacher, so that the white teacher could insure quality education for the students.

(2) Compatibility of the innovation with existing norms of the school increased the probability of its trial and when adopted, its persistence.

(3) Innovations adopted as a resolution of a crisis, have a low persistence rate.

3. From Statement to Hypothesis.

The study moved from field based observations to specific statements and from this point, moved to the development of an overarching hypothesis encompassing all of the statements. The hypothesis was stated as:

> System innovative thrust interacts with personnel innovative thrust to determine selective educational change.

The hypothesis is more readily understood when the basic phrases are definedas follows:

a. System innovative thrust is the power of an organization which is directed toward achieving innovation and change.

b. Personnel innovative thrust is the power of individuals which is directed toward innovation and change.

c. Selective educational change includes a change in existing practices, trial rate, adoption rate, locus and type of innovation and persistence rate.

B. An Illustration of the Anthropological Approach

The second task of this paper was to provide an example of the anthropological approach to a research problem. One of the most exciting aspects of the field based, case study approach was the manner in which the team members were able to get beneath the surface of the situation. By living in the community, conducting indepth interviews and following selected leads, the team members were able to shed some light on the "why" as well as the "how."

One example, which I have selected, may not be particularly relevant to this audience but it should provide an insight into the nature of the results which we have documented in the study.

In one rural county, we noted the system was involved in structuring the school program to accommodate the new concept of the middle school. At that point in time, this was an innovation and we were pleased to read reports that such a small county had accepted the middle school philosophy and had translated it into actuality. We sent our team of anthropology students in to find out why it happened, to describe in detail the reasons it was adopted and just how it was working.

We learned more than we really wanted to know and we since have wondered perhaps we should not have asked. Dr. Eddy has just published an excellent description of this situation in the Summer issue of the Human Organization Journal.[3] This is the first we have told it as we found it.

Briefly, here is some of what the field researchers reported. The middle school building was a former black school in a black neighborhood, left empty by recent desegregation orders. The building was run down and in a general state of disrepair. A new eight foot chain link fence surrounding the grounds was constructed "to keep out stray dogs." The school entrance had been changed to make it possible to drive up to the school without driving through the heart of the black neighborhood. The teachers who were assigned to the school had all participated in the 1968 teacher walkout. All major leadership roles in the school were held by white teachers. Black teachers were found in the sixth and seventh grade teams but not in the more prestigious eighth grade teams. The learning climate was tense, to say the least.

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[3] Dr. Elizabeth M. Eddy. "Education Innovation and Desegregation: A Case Study of Symbolic Realignment." Human Organization, Vol. 34, No. 2, Summer, 1975.

This was only one situation in which we found the outward appearance of new and exciting innovations but when the true situation was ferreted out, there were some confounding variables interacting with easy, simple statements of the process of change. We have concluded that the diffusion/dissemination process is much more complex than can be discovered or much less understood through traditional surveys or questionnaire studies.

C. Recommendations for Action

Some of the recommendations may appear to be beyond the scope of the study but it seems we need to translate some of the findings into action. major question we should consider is "How can a University focus on the problem of dissemination and diffusion of innovations and work with the public schools?"

The field work and analysis of our data suggested a strategy that would not only aid in the diffusion of innovations but would also increase the potential for the continuation of adopted innovations. We found three guidelines that seemed to be important for the adoption and maintenance of an innovation. First, an innovation must fit with conditions in the local school. This includes a consideration of the socio-economic and political setting, traditions, the leadership structure and local priorities for allocating resources. Second, an individually geared campaign for implementation increases the potential for successful diffusion. Such a campaign must address itself to both the formal organizational structures and the informal social networks as they exist in the school system. Third, successful diffusion and continuation of an innovation requires that the personnel involved with the innovation receive adequate training and skill development, as well as continous support and individual reinforcement.

This data base has led us to suggest that it might be feasible to create some type of innovation diffusion and support system within each state. Such a system could be established as a center within a university and function as an outreach program. The center could be involved in the entire diffusion process--from selection of target school systems to development and implementation of a campaign strategy to continued follow-up support. Some of the possible steps involved in such a system have been considered and presented here.

The University could assist local or county faculty groups and administrators to determine whether or not a specific innovation was appropriate for their system. Criteria would include the "fit with local conditions" and the interaction of variables in particular schools, the county offices, and the community. This step would require extensive on-site field work by the university staff.

Once a target district has been identified, three levels of personnel would be involved in a series of workshops aimed at increasing the success potential of the innovation to be implemented. Workshops would be developed for (a) the appropriate county and possibly that state supervisory staff members, (b) the school principals and (c) the teachers who would be involved in the implementation. Workshops should deal with each level of personnel separately before bringing them together.

Utilizing the field work data that will be gathered by the university center team, the workshops could be developed to emphasize the following:

For county staff - Resource allocations and support strategies, development of inservice programs, community relations, possible political sanctions and a study of administrative problems that can be anticipated.

For principals - Personnel management, removal of possible threats to teacher security, implementation of innovations, change theory, methods for involving parents, school traditions, and role expectations.

For teachers - The effect of the innovation on classroom practices, problems and benefits, mastering techniques and mechanics required by the innovation, study of traditions, techniques for effective communication to get their ideas into the plan.

Ideally a university team might address itself to the problem solving orientation of school administrators and try to involve teachers in developing innovative solutions to needs as they see them.

To test the basic viability of the university-school partnership approach, the University of Florida research team members returned to each county where they had collected data. The teams reported general findings to administrators and faculty without identifying individual cases or schools. Techniques which we found to be critical, roadblocks, and guidelines for the diffusion of innovations were discussed.

Judging from the enthusiastic reception received, we are guessing that a much closer working relationship between public schools and the university would be welcomed. We were told by the faculties that this was the first time researchers had ever returned to report their findings. A formal structure such as a center would provide this type of cooperation on a regular basis.

SUMMARY

In summary, this paper presented three topics for discussion:

1. To describe a research study which moved from field based observations

to critical statements to the development of the following hypothesis: "System innovative thrust interacts with personnel innovative thrust to determine selective educational change."

2. To illustrate the viability of the anthropological approach to a research question in education, and

3. To expand the data to present a plan for a university center for diffusion/dissemination of innovations.

In conclusion, I will quote the time-worn phrase of all doctoral dissertations "The author recommends that further research be conducted in this area."

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[11] James W. Hensel, Professor & Chairman, Department of Vocational, Technical & Adult Education, University of Florida.

AGRICULTURAL EDUCATION SYSTEM/PROCESS: THE DIFFUSION OF AGRICULTURAL TECHNOLOGY WITH A DISCUSSION OF THE CONTEST AS A DIFFUSION TECHNIQUE

Dr. Ted Buila[12]

When I was asked if I would be interested in presenting a paper at the Central Region Research Conference it was suggested I contribute something about the "diffusion of agricultural technology" and "diffusion theory." The immediate need for a title was also indicated. In the absence of a "ready" paper, I suggested the title "Educational Process and the Diffusion of Agricultural Technology."

I have found it difficult to ignore the proposed subject matter, and equally difficult to abide by the suggested title.

I've been struggling with this paper for five weeks, trying to be scholarly and practical at the same time. (This explains, in part, my adding the discussion of the contest. Perhaps the single best, certainly most comprehensive, instructional strategy to maximize educational resources in the agricultural teacher's portfolio.)

What follows is a progress report.

I emphasize my tentativeness of judgment because, although I have a deep and abiding interest in "diffusion theory," I recognize the task exceeds my temperament.

I have grown to have an ag teacher's "mentality." That is, my concerns are immediate: With youngsters. Their parents. The countryside and its people. I find that I am manager of something called "educational resources." My prime task, my metier, is to maximize available educational resources (people, institutions, knowledge, equipment/things, the natural environment) to achieve results for the people I am serving.

Seen, in this context, agricultural technology represents a potential resource. The direct (first) object of agricultural technology being rural America. New farming practices, equipment, management techniques should be designed to assist the people who "consume" the technology. Thus, when I look at the question of diffusing new technology, I see it in a framework of technology for rural people, agricultural students, and then for society in general.

So far, so good. Yet, whenever I reflect seriously about my job, I am bothered. I am bothered mostly by the fact that teaching agriculture or acting as a rural change agent enjoys its status without the benefit of a supporting framework on whose soil one might hope to grow generalizing and organizing principles, operationally verifiable methodologies, and discrete applications that serious disciplines possess.

Aside from the intellectual imperative to rationalize a System of Agricultural Education there are several practical questions agricultural education must face head-on that relates to its very existence. Here I'm speaking of the familiar concepts and values that give purpose to agricultural education. Namely, that agricultural education's guiding purposes are to prepare people to improve the quality of rural life and insure America's food supply.

Unfortunately, the guiding purposes of agricultural education don't "shake down" with what is happening in rural America. That is, food production continues to grow while the farm population continues to decline (less than 4% in 1975). The question has to be asked, "Isn't there any other way to improve the quality of rural life than to move farmers to the city?" If, indeed, agricultural education is to take a measure of credit for food production, who gets the credit for the "For Sale" signs that dot the countryside?

Two of the very real internal conflicts we face look something like this:

(1) There is an almost symmetrical mismatch in purpose statements justifying agricultural education that are, at the very least, adversary. The belief that abundant supplies of food, fiber, and farm people are essential to national security doesn't "sink." Abundant supply (in our economy) generally leads to competitive market situations which, in turn, results in the concentration of production in ever increasing farm units that have the capacity to remain competitive at decreasing profit margins. Abundant food supplies have resulted in the wholesale reduction of the farm population raising the question, "Is the goal of abundant food supplies compatible with the goal of a large, or even a modest sized, farm population?"

(2) I'm convinced that the justification of agricultural education as a means to achieve the goal of a higher standard of living on the farm means precisely what it says, that is, it never carried the notion that it would be achieved through a wholesale farm to city migration. Likewise, I'm convinced that agricultural education intended that the rural standard of living be improved in place, not by moving people to the city and divide what was left among the remaining farmers.

If, indeed, I'm even partly correct in my reading of the current situation, then agricultural education is faced with the paradox of being a contributing party to both the problem and its solution. The fact is, that our ad hoc selection of the first (newest) technology is leading to anti-goal results. It certainly must be obvious that production and management technology that carries increased capital requirements insists a "capital for labor" substitution take place. The net result sees a displacement of farm families to off-farm modes of making a living.

The keying on production and "efficiency" research (as high priority items in the USDA and Land Grant College agenda) at the expense of organizational techniques/strategies to secure more equitable returns to farmers and farm labor (e.g. action steps to pass rising production costs on to the consumer), simply accelerates the decline in family farm numbers.[a]

To the extent that agricultural education has traded off instruction geared (1) to preparing its graduates with the capacity to deal with small farm production technology (and I'm not talking about 15 H.P. tractors!), (2) to develop production mixes requiring minimum capital investments, (3) to employ marketing techniques which insure equitable profit margins, and (4) to develop strategies to strengthen the social/economic infrastructure of rural America, we've helped facilitate the exodus of the family farm from American agriculture. One last note. The recent USDA rebutal (Washington Post, August 17, 1975, p. 3) of the GAO's plan for small farmers calling it a "waste of money" is further evidence that agricultural education may be going to the wrong church if it wants to serve rural people.

There is something happening, as Dylan sang, but we don't know what it is, not exactly. Let's see if we can find out. Utilizing the subject thread of "diffusing agricultural technology," I'll try to do four things that might permit the invention of some answers that will allow us to examine the direction of agricultural education:

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[a] I'm not suggesting that agricultural educators are party to a conspiracy to pack up the farm population for a permanent move to the city . . . but they're not all that innocent on the other hand. As members of the Church of the Agricultural Holy Trinity (USDA, Land Grant Colleges, and CES) we've read the pastorial letters that tell us, "It's a waste of time and money to help the small farmer. The best thing you (we) can do for him is help him see the "light" and "sell out." (Ag Econ 100) We know the Trinity is serious in its worshiping efficiency and increased food production when we see USDA/ARS research man year allocations specifically targeted to raise the level of standard of rural people hover around the 2-3% level (71 scientific man years out of a total of 3.045 in 1969). At the very least, it appears that the concern for abundant food supplies and efficient production technology, which translates out as economies of ever increasing size mask the Trinities' concern for rural America. See the USDA's Science and Education staff's Inventory of Agricultural Research, FY 1969-1970, Vol. II (October 1970) for detail on research allocations.

First, I'll present a systems view of agricultural education. I'll focus briefly on anchoring the process (as a sub system) in a larger framework.

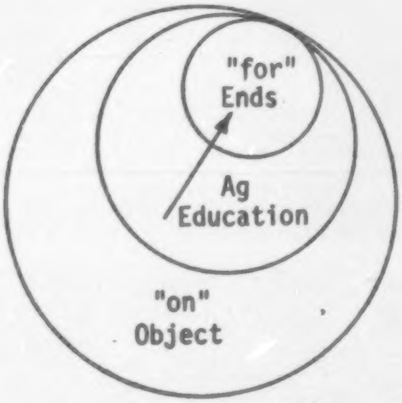
Second, perhaps more important, I'll focus on the audience of agricultural education and discuss the purposes for its development. This will serve to clarify both my philosophical biases and will be useful in covering some of the experimental ground in developing situational construct of the educational system in agriculture.

Third, a situational outline composed of agricultural education system elements is presented and briefly discussed with an eye to maximizing planning to achieve program goals.

Fourth, as a link to the real world through the high school classroom, a loan analysis contest (as an example of a contest) is discussed as a means to diffuse new farming/management practices and as a strategy to maximize available educational resources.

I. A Systems View of the Educational Process in Agricultural Education

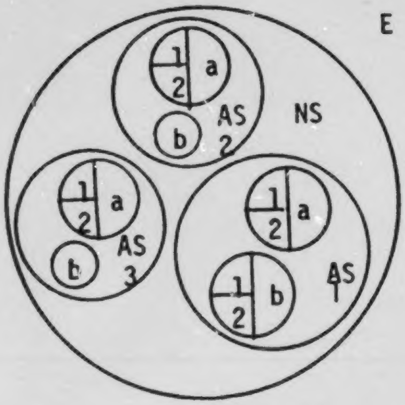
First, it is obvious that agricultural education is an activity which focuses on something - a person or entity that is distinct. Second, agricultural education is applied to a person or entity for some specific purpose or purposes. Thus it is upon the dimensions of "on something" "for something" that we can focus our attention:



Seen in this way the "on" or "object" factor in the agricultural education equation is relatively easy to identify: individuals or groups of individuals. The "for" or "ends" factor is more difficult to pin down once its indirect/overlapping effects are seen as encompassing an unlimited number of dynamic entities (systems and sub-systems), e.g. the political arena, commerce, national defense, education, producers, consumers . . . each of which can, and do, temper the purpose/goal statements of agricultural education.

As a first step it seems prudent to identify the system and sub-system relationships that directly and indirectly affect agricultural education. We know at the outset that system and sub-system relationships are immeshed and sometimes are at odds with one another. For example, conflicts between "activity sectors" within the national system. An industrial economy (not unlike that in the U.S.) might have a cheap food policy - written or unwritten. However, for political/social reasons a cheap food policy is not consistent with the well being of all members of society -- particularly those who have to contribute to producing "cheap food" (e.g. farmers and farm laborers). Similarly, intra-sector conflicts exist such as in agriculture where a continuing debate exists on research priorities: rural development technology vs. plant/animal production technology. I'm only prepared to offer an outline of a systems approach as a first step to understanding the maelstrom in which agricultural education seems to be anchored.

Using the language of the planner, we have a national system (NS) on an environmental (E) meta-system backdrop. The national system is comprised of activity sectors (AS) such as defense, commerce, and agriculture. These in turn are comprised of sub-system components and elements ($a_{1,2} \ldots$, $b_{1,2} \ldots$):



Environment: historical and contemporary. A dynamic of human and natural elements.

National System: activity sectors (e.g defense, commerce, political, agriculture . . .)

Activity Sectors: e.g. defense, commerce, political, agricultural . . .

Sector Components & Elements: e.g. agricultural education as a common component in the defense, commerce, political, and agricultural Activity Sectors.

We see agricultural education as a sub-system component $(a_{1, 2} \ldots)$ which can, and often is, nested simultaneously in several activity sectors of the national system. For example, food production (a target goal of agricultural education) is common to the political, economic, and social sub-systems. As a result, agricultural education's goal statements are oftentimes sensitive to activity sectors outside of agriculture (oftentimes unknowingly to agricultural education). Once the sectors and sub-systems in which agricultural education is nested are identified/charted the task of achieving compatible educational results can be initiated.

II. The Audience and Purposes of Agricultural Education

The viewing of the "on" and "for" of agricultural education as being played out on an extremely sensitive backdrop of system situations permits us to make the following definitions to initiate the development of an agricultural education systems construct:

A. Agricultural education acts on some object (individual or group),

B. Agricultural education is for some specified purpose(s) to effect specific change(s) in the object, then,

C. Agricultural education is the executed plan (or how) of actions designed to achieve specified purposes (previously defined):

"On"	"How"	"For"
(Objects-Who)	(Plan)	(Ends-Purposes)
Prospective and practicing farm operators/managers	Ag Education	1) National Security 2) Improve farm living standards 3) Provide a universal practical agricultural educational for rural people.

The first, and perhaps, most important characteristic of secondary agricultural education is the identification of the producer-owner-manager audience as opposed to the agricultural worker as its prime audience. With the exception of CETA/MDTA adult programs, they key on "narrow" job skills, agricultural education in the 1970's retains a broad curriculum content profile to educate further proprietors.

Nowhere is this better seen than in what appear as specialized occupational offerings at the high school level. On examination, what appears to be gainful work training (which it clearly is) is instruction designed to develop and strengthen the facilitating (doing) skills of the producer-owner-manager. Virtually all instruction is built on a foundation of accounting, organizational structure, organizational economics, tax law, parliamentary procedure . . . hardly the curriculum core one would expect to train a tractor driver or that Taylor had in mind in training the efficient employee. You'll remember that it was Taylor (The Principles of Scientific Management) who, in 1899, achieved fame when he taught a Dutchman named Schmidt to shovel 47 tons of pig iron a day instead of 12½ tons. Every detail of the job was specified: the size of shovel, the bite into the pile, the weight of the scoop, the distance to walk, the arc of the swing, the rest period . . . Unfortunately, Taylor lamented:

> "One of the very first requirements for a man who is fit to handle pig iron as a regular occupation is that he shall be so stupid and so phlegmatic that he more nearly resembles an ox than any other type."
>
> Frederick W. Taylor
> "Scientific Management", p. 59

What has unfolded is a unique form of entrepreneurship education. Instruction is unique on two scores. First, because it spans the skills of the worker, manager, and proprietor. Second, agricultural education, and to a lesser degree home economics education programs, continue as the only U.S. public school educational programs that continue to stress the development of proprietorship skills in program graduates.

To the best of my knowledge there has never been any serious looking back by agricultural educators in the belief that students should be instructed/trained as worker-proprietors. In practice, once a student selected an area of agricultural interest (on or off-farm) instruction is not considered complete until the student has an opportunity to gain proficiency in all of the major production and management skills necessary for success as an employee or owner-operator.[b]

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[b] The 1968 Vocational Education Act speaks to instruction for gainful employment. The notion that students can/should be educated for self employment is lost--in fact, the disection of home economics education denied the existence of the basic economic unit in our society: the family. In this respect, home economics education had/has the very real responsibility of proprietorship education for the entire American economy. The current vogue consumerism enjoys is but a portion of the proprietorship educational package common to home economics education. With respect to the American farm--there were about 2½ million farm units at last count. There is no telling how many more farms there would be if agriculture could master the technique of passing increased costs and fair labor costs on to the consumer. The simple fact is that the replacement needs for farm and off-farm "proprietors" is real. Moreover, I suspect that the future need for agricultural proprietors is not so much tied to the economic laws of the USDA as it is to the ability of agriculture to secure an equitable return for the labor it invests.

The reason for stressing the "entrepreneurship" dimension in agricultural education is clear and simple: farmers need the managerial skills and organizational abilities to both program production and to secure equitable returns for the products of their labor. This holds equally true for those engaged in "off-farm" endeavors (e.g., custom operators, farm supply, florists . . .)

Viewed in these terms, agricultural education is the education of the whole man, a unit, a owner-operator, rather than a fraction of the unit, a laborer. In this sense, secondary agricultural education was born in the cradle of Rousseau. Agricultural education is designed to educate man to fully use his environment, his citizenship and social institutions (rather than be a slave to them, as Rousseau warned).

Agricultural education, at the very outset, did not stop with the mere acquisition of knowledge and developing a measure of self awareness. Its task was to prepare the young agriculturist with the facilitating skills to ripen at his own pace, to adapt to a changing environment, to safeguard his self and family (and ultimately society in the final analysis).

For what purpose does agricultural education exist? At the outset, at least, it appears there are a large array of "purposes" that give substance to agricultural education. It might be useful to make certain couplings and distinction such as political/economic, social/economic, and philosophical/social, as long as we remember that these are arbitrary constructs. Reality does not abide by such distinctions.

A. Political/Economic. National Security. Abundant supplies of food and raw materials are essential to the nation's well being, Implicit are the notions that (1) food should be available/priced to eliminate want to permit maximum growth in other sectors of the economy and (2) a rural population base is necessary to maintain the strength, body, and character of a nation.

> "Upon the developments of country life rests ultimately our ability by methods of farming to feed and clothe the hungry nations; to supply the city with fresh blood, clean bodies, and clear brains that can endure the terrific strain of modern life; we need the development of men in the open country, who will be in the future, as in the past, the stay and strength of the nation in time of war and its guiding and controlling spirit in time of peace." (Bliss, 1952, p. 92)

President Roosevelt, 1909
Letter to Congress on the Country
Life Commission Report

B. Social/Economic. Improvement of the rural standard of living. Implicit is the notion that farmers will help themselves through better farming, better business, and better living on the farm,

> " . . . the object of the Commission on Country Life is not to help the farmer raise better crops but to call his attention to the opportunities for better business and what I believe it ultimately will be--one of the most dignified, desirable, and sought-after ways of earning a living--the farmer must take advantage not only of the agricultural knowledge which is at his disposal but of the methods which have raised and continue to raise the standards of living and of intelligence in other callings." (Bliss, 1952, p. 91)

President Roosevelt, 1908
Appointment of Country Life
Commission

Included was the direction "given" to agricultural colleges, namely, that their task would not be complete until the gain from increased production was equitably divided:

> " . . . until every farmer and planter shall be so well instructed that he will mold the soil to his profit and the seasons to his plans, till he shall be free from the vassalage of mortgage and the bondage of debt and become a toiler for pleasure, for home, for knowledge, and for country; until capital and labor shall unite under the leadership of knowledge and equitably divide the increment of gain." (Bliss, 1952, p. 38)

Seaman A. Knapp, 1894
Address, Mississippi A & M

C. Philosophical/Social. The establishment of a new, alternative form of education, that is practical, productive, and universal (vocational, as opposed to the grammar school or classical gymnasium). Lost, as a philosophical purpose in the 20th century, was the physiocratic belief that agriculture is the only real industry. What isn't lost is the Protestant view that once man selects his calling ("Career"), he is not free to relax. That is, he must be a productive partner of God in the continuing process of creation. (Bliss, 1952, p.38) This rationale for a new form of education, open to all members of society, is expressed by Lincoln in an address before the Wisconsin State Agricultural Society at Milwaukee in 1859,

> "the old general rule was that educated people did not perform manual labor. They managed to eat their bread, leaving the toil of producing it to the uneducated . . . But free labor says "No." Free labor argues that as the Author of man makes every individual with one head and one pair of hands, it was probably intended that heads and hands should cooperate as friends, and that that particular head should direct and control that pair of hands. As each man has one mouth to be fed and one pair of hands to furnish food, it was probably intended that that particular pair of hands should be cultivated and improved by whatever will add to its capacity for performing its charge. In one work, free labor insists on universal education." (Slosson, 1921, p. 222)

It's time to stop for a moment and try to organize the various ideas concerning the "why" and "whos" of the educational process in agriculture.

To summarize, we started with the notion that agricultural education focuses on farmers (owner-operators) as the object of its efforts. That it is, or was, designed for purposes related to national security, improving the rural standard of living, and to establish a practical (vocational) education in agriculture that was universally open to rural people. I further related problems I found in the goal statements of agricultural education: their relationships were adversary at best which necessarily leads to the misusing of program resources.

There are two important conclusions (for agricultural education) to be drawn from these observations:

1. Technology development. If the co-goals of abundant food supplies a "modest" farm population are to be maintained, (10-20%), the development of production, processing, and marketing technology (accompanied by diffusion

and implementation strategies) geared to "family size operations" is required.

2. Educational Systems. If the Farmer (owner-operator) is to achieve the twin goals of high production and an improved quality of farm life through self directed action programs-efforts, his/her education must develop the necessary facilitating skills for self/group action.

To the extent schools maximize available educational resources to achieve these ends, they should be held accountable.

III. A Situational Outline of Agricultural Education System Elements

Earlier I referred to the imperative of rationalizing a system of agricultural education for the concommitant purposes of facilitating communication to eliminate goal conflict and to maximize educational resources. Likewise, I've just finished suggesting that education should be held accountable in this task.

I've used the entities of who, what, why, how, when to codify the array of elements for identification purposes. It should be remembered that the titling of the elements is arbitrary as are the parameters we assign them. In reality, agricultural education does not abide by discrete distinctions. The teacher and learner experience reality in the form of an immense intermeshed ecology that interacts: farm, home, community, school.

While the outline attempts to chart the system territory of all agricultural education, the elements are described as a secondary teacher might encounter them. Common sense demands that we know our territory/product if we are to managers of change. The elements are portrayed in Figure I with the following explanatory notes:

1. Environmental Context. Individuals, families, institutions,

Figure 1. A Situational Construct of Agricultural Education System Elements

(1) Environmental Context
(Resources - limitations)

- Heriditary
- Socio-Economic
- Natural

(2) Audience
(Who served)

- Individuals
- Groups
- "Owner-Managers"

(3) Educational Parameters
(What taught)

- Knowledge Accumulation
- Environmental Awareness
- Facilitating Skills Development

(4) Purpose
(Why)

- National Security
- Improve Farm Quality of Life

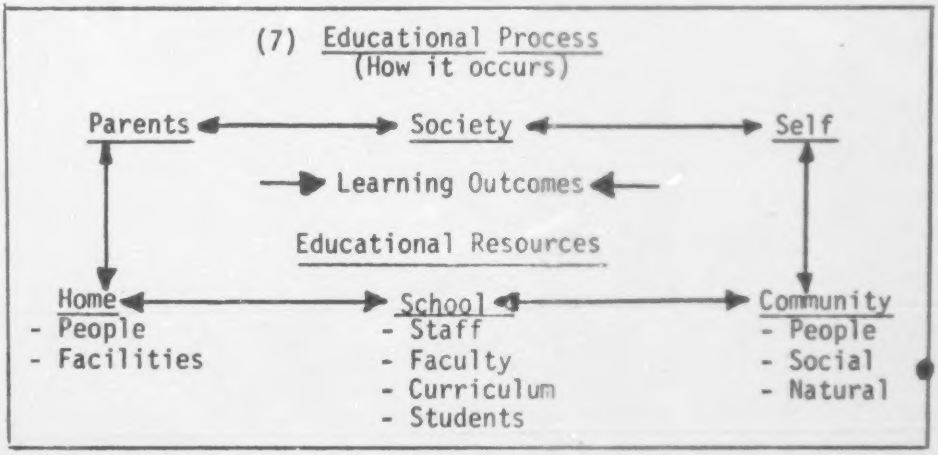
(5) Educational Results
(Learning Outcomes)

- Accumulation of Knowledge
- Awareness of Environmental Resources
- Individual Facilitating Skills
  - awareness
  - information processing
  - decision making
  - goal setting
  - expression
  - value orientation

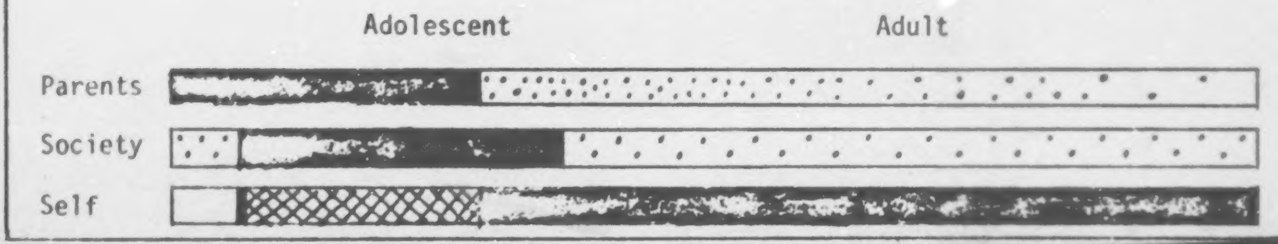
(6) Educational Responsibility
(Who)

- Parent
- Society
- Self

(7) Educational Process
(How it occurs)



(8) Educational Process Timeframe



(e.g. schools or firms) societies are limited in varying degrees by natural conditions that preceeded their particular existence. Individuals don't have a choice when it comes to the gene mix they possess. Similarly, children born into well-to-do families have more economic resources to work with. Additionally, the climate or soil type frequently exercise constraints on possible activities (e.g. growing bedding plants in Alaska). However, not all environmental or political situations are immutable as can be readily seen by the Alaskan horticulturist who constructs a greenhouse or the immigrant who starts life anew. Important here is not so much the constraining effect of the environment but its charting, so that action plans are made sensitive to its existence.

2. Audience. High school students preparing to farm or enter agribusiness and adult farmers comprise the prime audience of agricultural education. Enterprises span production and service on farm and off farm. (We noted earlier some would argue that the off-farm agricultural employee is the prime audience for agricultural education.)

3. Educational Parameters. The dimensions of what is taught-learned encompass three areas: (1) Accumulated knowledge. These span, but are not limited to, general and technical subject matter specific to agricultural enterprises; technical and management skills/processes required in production, processing and marketing; individual and societal value orientations, (2) Environmental resource awareness. These span the physical/natural/cultural geography of a region; its people, its social and economic infrastructures (e.g. businesses, institutions, roads, and communication networks) and (3) Facilitating skills. These are the "doing" skills necessary for self action in managing the environment, its institutions and technology. These encompass awareness (a desire to know an eternal curiosity), information processing (codify/separate information), decision-making (analysis/judgment), goal setting (program for action), expression (job competency/communication/self-discipline), values (ethics/work attitudes).

4. Purpose. The general goal of agricultural education is to prepare individuals to assure national security (e.g. food, fiber, and rural population) and improve the quality of farm life through self-help efforts.

5. Education Results. The accumulation of knowledge coupled with an intimate awareness of the natural and social environment represents the first category of learning outcomes. The second set of learning outcomes are facilitating skills - abilities that focus on putting the first set to practical-productive use. In short, facilitating skills are "doing" skills. Generally, they denote action.

   a. Awareness - a curiosity to know as opposed to "awareness" through ignorance,

b. Information Processing - inventorying, codifying, storing, and recall of bits and pieces of information/experiences.

c. Decision-making - ability to analyze, evaluate, judge, make rational "go-no-go" decisions,

d. Goal Setting - results orientation-set targets, programming ability,

e. Expression - self-discipline, initiate action/pursue goal(s), job competency, communication (speech-written/individual-group), self-concept as an achiever.

f. Values - ethics, integrity, and work attitudes.

6. Educational Responsibility. Parents, society, and the learners themselves are "responsible" active (natural) partners in the educational process. Parents (e.g. relatives, siblings, family friends) provide the early direction. Society (e.g. schools, employers, agencies, churches) add and extend the foundation provided by the parents. The individual learner assumes the major burden of responsibility through a life long process of self-education.

7. Educational Process. Parents, societal institutions/people, and the learner form a natural education partnership. The learner, and those directing the learning act together to assist the learner in utilizing available educational resources to accumulate knowledge and catalogue the environment. Perhaps most important, to develop the necessary personal facilitating skills to maximize knowledge and environmental resources for self and society - for today and tomorrow.

   Functionally (for teacher and learner) educational resources are nested in three (overlapping) locations: home/parent, society/school, community/environment. The role of the agricultural instructor is one of orchestrating resource use through a full range of contrived teaching techniques/strategies that accelerate and intensify the natural ebb and flow of exchanges between people, technology, and the environment. Here I'm speaking of classroom and shop instruction, home projects, contest activity, field trips, fairs, work experience, FFA chapter activities, etc.

   Parents, relatives, teachers, colleagues, and "interested" people share past and current experiences. The home, farm, school, community, and region represent a treasure chest of "tools and things" which children/adults interact with to learn. Through the natural dynamic of imitation and participation the educational process prepares the student for the role of an instructional manager to direct his/her personal life-long education to insure that self and society are equally served.

8. Educational Process Time Frame. The educational process is a life-long process. During the early stages it is parent and institution

> directed. Institutions such as churches and schools provide direction early. In adult life, institutional direction is intermittant. It's punctuated by industry propaganda, in-house OJT programs of firms, and agency training/service programs. People, in the final analysis, are the process actors - parents, relatives, friends. The learner being the most permanent member of the cast.

In summary, the consequences of proceeding ad hoc with an action strategy effecting any point of the educational system should be manifest by now. The system is an intricate dynamic of elements. The message for schools is to recognize the relatively short period of time available to them to achieve the dual tasks of preparing the learner for a life long educational experience while sharpening the individuals knowledge/awareness and facilitating skills to contribute to self and society. The question is how best to utilize the educational resources available to achieve stated goals? Recognition (program administrators and teacher educators) that the majority of learning occurs naturally out of school, coupled with the fact that the out-of-school learning resources dwarf those inside the school, should be a caution signal to those who would confine education to contrived in-school situations.

IV. The Contest as an Instructional Technique to Diffuse Agricultural Technology

In our discussion of the educational process we noted that the contest represented one of the instructional activities in the agricultural teacher's portfolio of student learning experiences (e.g. classroom study, field trips, projects . . .) We further noted that these learning activities were structured or contrived to accelerate and intensify specific types of natural relationships between the students, people, technology, subject matter, environment . . . for the purposes of assisting the student to cope with the "real" present and to prepare him/her to maximize the future.

Having recounted this, I must add that I can't think of another instructional activity that agricultural teachers are more divided on the contest.

Very few teachers are neutral on the subject of contests. Those teachers who tolerate the contest, out of a sense of duty to the FFA, can best do without them. Likewise, those teachers who actively support the contest movement are confirmed believers.

I'll leave the debate on whether or not the contest "belongs" as an instructional activity in agricultural education for the moment. However, the simple fact is that contests are in the repertoire of agricultural education. Moreover, they are not only "alive and well" but they are thriving . . . 20 plus different contests in California during 1975!

To start the relative merits dialogue on contests, I'll examine the contest as a technique to diffuse and adopt new technology. First, I'll examine development/diffusion-adoption literature. Second, using a loan analysis contest as an example, we'll analyze the contest in terms of its opportunity potential to maximize available educational resources and strengthen student facilitating skills. Third, we'll examine some of the educational cost-benefits' (advantages-disadvantages) of contests.

1. Diffusion - Adoption Research Literature. A substantial diffusion theory-adoption process literature exists with an abundance of empirical documentation. As a point of departure, let's direct our attention to the relative impact value of mass media versus personal contact as it affects the adoption process.

   An often overlooked fact is that the "awareness" stage is the most important step in the adoption-rejection process (i.e. awareness, interest, information, trial, adoption). That is, ignorance of new technology limits its very consideration. Diffusion studies in developed countries (areas where mass media has a history) tend to confirm the "first place" position of media when it comes to the awareness stage, e.g. herbicides, trickle irrigation or a new farm credit program. Radio-T.V., the print media, and manufacturer-education newsletters/bulletins continually bombard the producer with new agro-technology.

However, when it comes to the actual adoption (or rejection) of new technology, personal interaction is the key ingredient. Not only are friends, salesmen and extension advisors essential to the adoption process (face-to-face dialogues on personal expenditures, ideas, etc.) but so are the "invisible" social infrastructure triggering mechanisms that facilitate personal interaction. Ralph Beals, the anthropologist, in discussing change in Mesoamerica made an unusually profound case for the road as a triggering mechanism:

> "If I were to rate the acculturative forces I have seen at work in the various communities I have worked, I think I would suggest that one road is worth about three schools and about fifty administrators."

The actual adoption of new technology is a highly personal decision whether it be in Colombia, Iowa or Yugoslavia (Rogers, 1969, Buila, 1973). Likewise, common sense tells us that the more modest in size the farm operator is, the more questionable media is when it comes to precipitating a final go-no-go decision. The risk is simply too high for small producers to take a chance on unfamiliar or only partially understood technology.

Interestingly, it's not only the "less educated" farmer that requires personal information. Communications studies by Katz and Lazarfeld (1955) and particularly Katz's comments in his "Two-Way Communications" article (1960) suggest it is not just the poor uneducated peasant that can't "handle" (conceptualize) mass media. When physicans turn to fellow doctors and pharmaceutical "detail" men for adoption advice (Coleman, 1957), we can be sure that the diffusion-implementation process is embedded in the tissues of its human participants.

The spread of new technology appears to take place along two major axes. The first is by migration. People moving: industrial representatives, the seasonal workers that ebb and flow between the U.S. and Mexico. The second axis is what Scoville (1951) calls radiation. This is the increasing and almost imperceptable process of observation, imitation and "infection" vis-a-vis direct personal contact -- personal contact being the natural yeast of the diffusion process.

I mention this as a preface to the discussion of the contest as a diffusion technique, because the process of agricultural education from the very beginning intuitively relied on personal involvement (imitation and participation) instructional techniques to "carry the mail" when it came to getting new practices into use: field trips, home-community demonstrations, projects, work experience, FFA chapter activities, fairs, contests, guest speakers, etc. The agricultural teachers diffusion technique portfolio has always been people-based.[c]

2. The Loan Analysis Contest. Since we'll be working with a Loan Analysis Contest a description is in order. The central purpose of the contest is to promote the use of production credit as a farm management tool. Production Credit Associations (in California) have, at times, sponsored these contests. Operationally the contest looked something like this:

    1. The contest was regional (no state finals) with all FFA chapters eligible for entry. (I'm not aware of a parallel contest for 4-H clubs.)

    2. The contest was held at three levels: local, sectional and regional - with winners competing at the next highest level; and was generally limited to juniors and seniors.

    3. There were three competition classes at each level, depending on the nature of the loan: livestock, poultry, citrus/field crops.

    4. Completed loan applications with financial statements and production plans were distributed to each school a month before the local contest. (The same set of three applications for each school.)

    5. The object of the contest was to verbally (1) present the loan, (2) analyze the financial statement and production plan, (3) present "reasons" for loan approval or disapproval, (4) defend the final loan decision during a question period. A panel of local bankers served as judges. There was no written portion to the contest.

    6. Contestants had eight minutes for their presentation and five minutes for questions.

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[c] In fact, people-to-people learning was virtually "legislated" when the authors of the 1914 Smith-Lever Act (in Section 5) set a five percent ceiling on printing expenditures for the Federal Extension Service budget.

7. Scores were a composite of completeness/accuracy of presentation, strength of presentation, analytic rational incorporated in the final decision.

8. In practice the teacher would "teach" the loans for two weeks in class. Each member of the class would prepare a mini-presentation on one of the loans. The class winners would then compete in a Chapter contest, generally held at the local bank followed with a meal (hosted by PCA) with cash awards of $50, $25, and $10 for the first three places.

Once again, the expressed purpose of the Loan Contest was to promote the use of agricultural credit. However, to this day I am not clear as to who was the target audience of PCA: the students or their parents (i.e. the "loans" did go home to the dinner table)?

3. Contest Learning Outcomes and Educational Resource Utilization. The contest's impact on facilitating skills and educational resource utilization is presented in outline form in Figures 2 and 3. However, before proceeding with the outlines, let me suggest that what isn't directly taught about farm credit and its utilization may be more important than the new technology that is the focus of instruction. Here I have in mind intangibles such as:

1. An awareness of "new" people, "new" institutions and community resources gained by personally searching for information.

2. A "real life" opportunity to strengthen communication ability through discussing mature subject matter with adult community leaders, e.g. bankers, businessmen, persons and subject matter that are normally "outside" those encountered by 15 year olds.

The intangibles learned through local and state-wide travel are equally difficult to quantify. I'll always remember checking into a motel in Santa Barbara with 9 of my students on a contest trip. The boys were taking a bath . . . I couldn't help but hear them through the wall. Four or five of the boys had gone into the bathroom (I could hear the water splashing) but I didn't hear the drain water "noise" (I, too, was taking a shower.) I wrapped a towel around me and went next door. When I asked the fellows why I hadn't heard the drain water, I got some sheepish looks. As it turned out, the boys didn't know how to operate the drain on the tub. Embarrassed, they didn't want to "ask" me. As a result, six of the boys took a bath in the same water! You decide how important the unplanned intangible learning

Figure 2. Facilitating Skill Development Related to Loan Analysis Contest Activity

Facilitating Skill	Types of Development (representative selection)
Knowledge Accumulation/ Awareness	Information seeking (local-regional): parents, relatives, businessmen; motivation to accelerate "curiosity to know".
Information Processing	Work with different types of data; financial, production, plans, judgemental.
Decision Making	Synthesis/analyses of information; empirically based reasoning/logic.
Goal Setting	Translating decisions into actions;preparation of alternatives; programming of results/responses.
Expression	Verbal presentation: group and individual (practice) for self and clarity in interpersonal communications; self image reinforcement: owner and banker; self-discipline to prepare.
Values	Integrity of sound decisions; responsibility (banker to stockholders); pride/respect in a disciplined personal effort.

Figure 3. Educational Resource Use Related to Loan Analyses Contest Activity

Educational Resources	Examples of Use
Home	
Parents, Relatives, Siblings	Questions-answers, relate past experiences, opinions, ideas, presentation try-out, learning together (dinner table and in the barn).
School	
Ag Instructor	Background information, identify other sources of information, presentation critique/development, curriculum, source material.
Business Manager	Financial information processing, techniques, background information, source material, critique arguments/ decision of presentation.
Speech Instructor	Presentation delivery, debating logic, presentation try out/ critique.
Colleagues	Debate, trial, opinions, share source materials.
Community/Region	
Bankers (other than PCA)	Source material, financial information processing, decision making logic, presentation critique-quality of loan paper.
Extension Staff	Source material.
Producers/Businessmen	Past experiences, source materials, presentation development/critique.

experiences. However, I'm convinced that just because we cannot/or don't have the capacity to measure (or even plan for) intangible learning experiences makes them no less important educational outcomes than programmed performance objectives.

The single most important message to be conveyed, based on facilitating skills development and educational resource use, is that the contest is perhaps the most comprehensive learning "strategy" in the agricultural teacher's methods portfolio. If, indeed, schools (the public education industry) are ever held accountable, as they should, for maximizing available learning resources for every student (e.g. in the form of individual educational prescriptions that spell out specific learning outcomes coupled with educational resources use) the contest will be viewed more as a learning catalyst than as a "questionable" competitive activity.

4. Contest Cost-Benefits. Contests do have their costs. A teacher's time is real as is the time and lost productivity of community resource people. (Placing a price tag on this time is quite another question.) I point to these two honest issues (lost production can be estimated/costed) because contest critics focus on the competitive issue, i.e. contests are anti-educational because they foster competition.

Quite obviously, contests are competitive, but hardly in the sense of team sports. What is overlooked by contest critics is the self or individual competition (striving for personal excellence) that the contest precipitates. The loan contest is a good example of accelerated self-discipline. A loan brief has to be prepared. Likewise, arguments have to be anticipated and countered. The only educational cost involved here is one of time for teacher and student alike, to achieve personal excellence.

As to the charge that the contest isn't for every student, I'd be more ready to accept it if a full complement of contest activities reflecting contemporary agriculture were available. Livestock judging and farm mechanics contests, solid in their own right, hardly begin to chart the boundaries of agricultural contests. Computer assisted farm management analyses, equipment design competitions, marketing/packaging exercises, floral design competitions, equipment operation . . . are only the top of the contest iceberg. The imagination of agricultural teacher educators, agricultural college technology development experts, and classroom teachers has yet to be extended when it comes to contests. Potentially, there is a contest in every student -- and a student waiting for the right contest.

Rather than be judged too quixotic for my positive portrayal of contests let me close with a partial listing of contest "costs" and "benefits."

Potential Contest Costs

1. Time: securing source material, developing student presentations, attending contests, in-service education: lunch hours, after school, evenings. There is no question that a teacher can be "worked to death" by students keen on winning or placing high in a contest.

2. Risk of failure. Professional prestige/status. Teachers, for the most part, take contest "failures" more personally than their students! With 150-200 teams competing on a given Saturday, winning has a great deal of luck associated with it. And the students should know this. However, placing in the top 10% of competing teams is not so much luck as it is an investment in time away from the family and instructional (teacher) excellence.

3. Curriculum change. If loan analysis is added to the curriculum, generally something must be cropped.

4. Instructional program balance. Over-emphasis on contest activity at the expense of subject matter, home project supervision, FFA Chapter activities. Over-emphasis of competitive activities can occur.

Potential Contest Benefits

1. Student interest, self motivation to learn, instruction tends to carry itself, student centered instruction.

2. Learning approaches a natural real world situation with the intimate involvement of student, parent, school, and community: learning by doing.

3. Maximization of available educational resources: in school, home, and community.

4. A rapid "natural" incorporation of new production and management technology in the curriculum.

5. Opportunity for individualized instruction. Over 25 different agricultural contests operative in the U.S., there is, potentially, a contest interest area for every student.

6. Student self-development. An exercise in self-discipline for excellence. Facilitating skills are strengthened. Knowledge and resource awareness expanded by self activity. Opportunity for recognition.

7. A practical "real world" diffusion technique: directly to the student and instructor; indirectly to the home and into the community during information seeking activity. (The student, through contest activity, frequently precipitates in-service education in the instructor. The contest acts to trigger the

flow of new technology from college to high school out of "necessity", i.e. teachers tool-up rapidly motivated to do so by their students.)

SUMMARY

Starting Points for Agricultural Education Systems Research: Some Suggestions

1) Goals and Purposes. It's simply not enough for a group of elder agricultural educators to pamphletize the goals of agricultural education each decade. The meta system (environmental context) and national system/subsystems in which agricultural education is nested needs fleshing out. Each of the subsystems/sectors has its particular goals, clienteles to be served, and institutional boundaries to maintain. Two logical first steps would be to 1) identify the subsystems by name and purpose, 2) identify the areas of conflict and compatibility each possesses in terms of impact on agriculture/agricultural education.

2) Family Farm Survival. I'm not at all convinced that the management technology isn't at hand to bring a more equitable return to farm families for the products of their labor. To the extent that group action skills need to be sharpened, agricultural educations's responsibility is clear. Farm families/agriculture should never be placed in a position of going hat in hand into the marketplace. Eleven million plus members of agricultural cooperatives bear witness to the fact that group action is possible. It should take considerably short of 25 years to educate "agriculture" on the hows of going to the marketplace with pride and not hat-in-hand. We need an immediate effort to catalogue and refine production mixes (and develop new technology where necessary) to bring labor intensive operations into the competitive ball park.

3) Agricultural Education Sub-System Elements. Further refinement and qualification of the subsystem-elements will yield feedback for goal statements, optimum use of resources, and more effective instructional strategies. For example, the question of who is/should be served by agricultural education has direct implications on the educational parameters of what is taught. The proprietorship training necessary to prepare a greenhouse owner-grower "costs" considerable more than it does to train a worker to stick cuttings, water, and pot soil.

4) Educational Resources. Immediate attention is needed in the identification, inventorying, and evaluation of available educational resources - in school and community levels. In particular, a schema/approach needs to be developed that will allow local schools to accomplish this task and to maintain an up-to-date feedback system.

5) Instructional Strategies to Maximize Educational Resources. As learning outcomes are refined/accepted (element refinement per suggestion number three) available instructional strategies (e.g. field trips, projects, laboratory exercises) should be evaluated for their ability to facilitate "accepted" learning outcomes. Unused educational resources have educational costs to the taxpayers and to the learner. Likewise, these need to be quantified. It is quite possible that one outcome of this research would be individual learning prescriptions that would 1) stipulate educational resources to be utilized, 2) specific performance levels for learning outcomes, and 3) spell out school, teacher, parent, and student responsibilities.

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A METHOD FOR RECORD-KEEPING AND ANALYSIS OF EQUIPMENT AND RELATED COSTS BY EDUCATIONAL PROGRAM

Ruth G. Thomas[13]

Description and Use of the Record-Keeping System

The purposes of the system presented here are to provide a means by which educational equipment costs might be assigned to educational programs, and to provide for the collection and recording of instructional equipment cost data by program.

The system employs a micro-level approach to cost allocation. The forms used in the system provide for the on-going recording of equipment cost data as equipment is acquired and as changes in equipment status and use occur. By providing continual cost data, the system allows comparisons from one year to the next and allows the determination of relationships and trends.

Costs related to programs are charged to those programs. Since costs are also assignable to individual schools, it is possible to analyze all the cost variables included in the system by school as well as by program.

Gradual system development is allowed. Various portions of the system may be implemented without necessitating the implementation of all portions of the system. The system provides for program level breakdown as a starting point but also indicates how the progression to a finer course-level breakdown can be accomplished.

The system provides for PPB systems by using a program-based approach and by providing information useful for deciding between alternatives.

The system provides for analysis of direct and indirect costs, variable and fixed costs, joint and specific costs and recurring and non-recurring costs, for the equipment-related cost portion of total program costs, per student and other unit-program costs, differential program costs, excess costs, and marginal costs.

The system provides cost information in a form useful for cost-benefit analysis. Distortion of cost elements in such analysis is minimized by eliminating the need to assign equipment purchase expenditures to programs as current costs in the year of purchase and by excluding equipment purchase costs from assignment to educational programs.

The system yields detailed, decision-making information helpful for administrators in developing school policies, making resource allocation, and planning, budgeting and evaluating programs.

Unit costs obtainable using the data yielded by the system allow comparisons of educational programs within a school, between schools and between districts.

Information provided by the system is consistent with that required for state and federal reports. The information is also in a form compatible with information requirements for school budgets, as function-object identification is maintained.

The record-keeping and analysis methods developed for the system are suitable for use in either a manual or computerized system.

Form I: Program Equipment Inventory, Depreciation, and Cost Analysis

Form I, presented in Figure 1, provides for depreciation of educational equipment and for cost analysis of equipment by program. This form also provides an equipment inventory.

Form I has been designed so that sections might be included or excluded depending upon the amount of information desired. The heavy lines separate groups of columns which deal with related elements of information.

Column A, Inventory Number, can incorporate the program code number plus additional digits that identify the specific item. Column B contains the description of the item. Column C indicates the building in which the equipment is used. Column D indicates the room where the equipment item is either used or housed. Column E indicates acquisition date. Column F indicates year of expected obsolescense. Column G is for entry of the total installed price of a purchased item. Column H, salvage value, is to include the estimated trade-in or sale value of the ietm at the end of its expected life. Column I, expected life, indicates an estimate of how many years the equipment item is expected to yield service to the educational program. Column J represents the annual depreciation cost of each equipment item. Column K indicates the current value figures.

Column L allows the association of equipment costs among "sub-programs" by providing the association of cost variables with courses. Column M indicates the number of hours each equipment item is used per year. Column N indicates the proportion (expressed as a percent) of the total time an equipment item is used in this course. Column O indicates the course cost for depreciation.

Columns P - S are concerned with determining the yearly electrical consumption costs of equipment. Non-electrical eqiupment would require alteration of the headings on this form to accommodate the necessary measure of operation cost.

Column T includes service contract costs, repair costs and maintenance costs.

At the top left side of the form, the line labeled "Int." provides for a figure representing the interest on the money invested in equipment for the program category; and the line labeled "Ins." provides for recording insurance costs.

There is a form for yearly updating of Form I. The format of this yearly update form provides two sections which can be superimposed over the Form I master sheet. Columns K through O are included in one section and Columns W through T are included in the second section. By superimposing these forms containing only those columns requiring yearly examination and for some columns, yearly entries, information available on the master form needed for calculations on the yearly update form does not have to be re-copied.

The primary purpose for Form I is its function in spreading the initial cost of an equipment item over its expected year of service. The availability of yearly cost information concerning equipment purchase prices eliminates the problems of determining annual program costs using current operating cost figures. Thus, annual program costs can be calculated at any stage of the program without incurring cost distortions due to large equipment expenditures in initial stages of new programs.

Form I also yields cost information on a program basis which eliminates the necessity of sifting through school district documents.

Including equipment power consumption costs and costs for equipment maintenance and repair in Form I yields information about these cost areas on a program basis. Thus, part of the need for prorating costs from district-wide figures is eliminated.

Form II: Jointly Used Equipment Inventory, Depreciation, and Cost Analysis Form

Equipment purchased for joint use between programs is included in Form II, presented in Figure 2. Form II allows assignment of costs to programs in much the same way that Form I provided for assignment of costs to courses.

Columns A and B would be filled in as for Form I. Column C indicates the building where the equipment is housed or stored. Column D indicates the room where the equipment is housed or stored. Columns E through K are filled in as for Form I. Column L indicates the code numbers of the programs for which the equipment is available. Column M indicates the number of hours each program uses the equipment per year. Column N indicates the percent of the total hours the equipment item is used in each program. Column O indicates each's program share of the annual portion of the purchase price. Columns P through T are completed in the same way as those columns in Form I. Column U indicates the percent of annual joint equipment cost for each program. Column W provides for recording interest on the capital investment cost for joint equipment by program.

Yearly updating of Form II is to be done by a yearly update form.

Form III: Rental Equipment Cost Analysis Form

Form III, presented in Figure 3, provides for the recording of information concerning rented equipment. Although the yearly cost of rented equipment could be extracted from current operating cost accounts because it is paid on a periodic basis, Form III provides for the collection of these costs by program. Form III contains the same basic kinds of information as does Form I with the exception of depreciation-related items and current value.

There is a yearly update form for yearly updating of Form III.

Form IV: Yearly Summary

Form IV, presented in Figure 4, is the summary form which facilitates the summarization of data, establishment of program totals, and comparisons between programs.

Summary

This system employs a micro-level approach to the on-going recording of educational equipment costs by educational program. The primary functions of the system include depreciation of educational equipment, determination of annual costs by educational program, by equipment item, and by course section for equipment acquisition, power consumption, maintenance, and repair, interest on the capital investment, and insurance. The system provides for cost analysis procedures which allow cost comparisons and the determination of relationships and trends.

The procedures recommended and forms presented here will likely raise as many questions as they have attempted to answer. It is recognized that they are incomplete and do not provide for all situations. For this reason, it is recommended that a continual effort be made to refine, revise, and gradually develop instruments which can adequately provide for most or all educational situations and which can yield appropriate data more efficiently.

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EVALUATION OF AGRICULTURAL EDUCATION PROGRAM ACTIVITIES AT THE FEDERAL UNIVERSITY OF SANTA MARIA, BRAZIL, 1971-1973

Richard F. Welton[14]

Purposes

The specific purposes identified to guide the direction of this study were:

1. To investigate the level of selected instructional competencies possessed in 1971 and 1973 by agricultural teachers in the high schools of the Federal University.
2. To determine how agricultural teachers in the high schools of the Federal University perceive the importance of selected instructional competencies in their own teaching.
3. To determine how agricultural teachers in the high schools of the Federal University perceive their performance and need for self-improvement of the selected instructional competencies.
4. To determine the extent agricultural education activities and services of the Brazil Project were helpful in improving the level of selected instructional competencies of agriculture teachers in high schools of the Federal University.
5. To determine the preference for continuation of agricultural education in-service activities and services for 1973 and beyond by agriculture teachers in the high schools of the Federal University.
6. To make recommendations that will aid in planning and strengthening the agricultural education program at the Federal University of Santa Maria and the agricultural schools administered by the University.

Procedures Used in the Study

A questionnaire which was developed to gather data concerning the kind and degree of assistance needed by the respondents to improve their teaching was administered in December of 1971 to forty agriculture teachers in the five high schools of the Federal University. Data obtained at this time were also used to measure the level of selected instructional competencies possessed by the respondents. This information was also useful in organizing and planning the in-service program and activities in agricultural education for the Brazil Project.

A second instrument was administered in May of 1973 to all agriculture teachers in the high schools of the Federal University who were involved in the in-service program and activities of the Brazil Project from December of 1971 through May of 1973. This instrument served to: 1) re-evaluate teachers' competence in the selected areas of instruction; 2) evaluate the effectiveness of in-service training activities; and 3) determine the need to continue in-service activities through 1973 and beyond.

Summary of Findings

The percentage difference between level of competency possessed by teachers om 1971 and 1973 in the four areas of instruction (classroom instruction, agricultural mechanics instruction, school farm instruction, and community oriented instruction) indicates that a majority of the items showed an increase. The highest overall percentage increase for competencies in an instructional area was reported in agricultural mechanics and followed by competencies listed under classroom instruction.

In each selected area of instruction, teachers indicated a difference between their actual performance and the importance attached to each competency. These differences varied within each instructional area. Summaries of the instructional areas showed the greatest difference between performance and importance for community-oriented instruction followed by classroom instruction competencies.

The index of need for improvement of teachers' competencies is arranged in an order of priority attention for the in-service education program. The teachers' need for improvement was the greatest in the competencies which represent new agricultural education concepts or those competencies which had not been emphasized in prior education training. Teachers need little improvement in competencies falling in the agricultural mechanics area of instruction.

In-service activities and services provided by the Department of Agricultural Education and Rural Extension and in-service coordinators were helpful in varying degrees in improving their level of competence in classroom instruction. Several items were reported to have been most helpful to teachers in agricultural mechanics instruction. This list included seminars, supervisory visits, slides and filmstrips, the intensive teaching course, and activities realized in individual schools. Teacher competency in school farm instruction was given the greatest assistance from the poultry nutrition demonstration and information on how to conduct the demonstration. The intensive teaching course was the most beneficial in-service activity in increasing teacher competency in the community-oriented instruction. The chick nutrition demonstration and accompanying nutrition information were the activities teachers reported to be most beneficial in increasing their level of competence in technical agriculture instruction.

Of the nine in-service activities listed for possible continuation after the conclusion of agricultural education phase of the Brazil Project, a majority of the teachers indicated that each should be continued. They were unanimous in their preference for workshops being held once each semester. These workshops were for training in-service coordinators and teaching technical agriculture.

Recommendations

These recommendations are presented as a means of strengthening and further implementing the agricultural education program at the Federal

University at Santa Maria and in the agricultural schools of the University.

It is recommended:

1. That all in-service agricultural education programs sponsored by the Department of Agricultural Education and Rural Extension in 1972 be continued second semester of 1973 and beyond. Special attention should be given to technical agriculture seminars, supervisory visits, demonstrations designed for classroom use, planning meetings, and the various services of the Teaching Materials Service. Teacher competency in all areas of instruction may be increased by a dynamic in-service education program.

2. That teacher competencies included in the "great" need for improvement category be given priority attention in the in-service education program. Other competencies categoried in the index of need for improvement should be given in-service program consideration according to the degree of need.

3. That the in-service coordinator of agricultural education continue as an integral part of the in-service program in the agricultural schools. The coordinator concept of in-service education has become an important part of the agricultural school system; however, if this effectiveness is to continue, additional attention, emphasis, and supervision by the Department of Agricultural Education and Rural Extension is needed. The coordinator position could be further strengthened by separating the duties of the school principal from that of the in-service coordinator in those schools where this situation exists.

4. That regular supervisory assistance be provided for beginning and experienced teachers in the agricultural schools. Supervisory visits would not only provide teachers with a source of technical and educational information to draw upon but would also provide a liaison person between the schools and the Department of Agricultural Education and Rural Extension.

5. That the Teaching Materials Service develop additional classroom and resouce units for use by agriculture teachers in their classroom teaching. These units should be prepared according to teachers' indicated needs and include: crop production, livestock production, and agricultural mechanics.

6. That an advisory group be utilized to assist in planning of teaching materials for the Teaching Materials Service. This group would lend assistance to the agricultural education staff in planning materials and in establishing priorities for development projects. Teachers who are utilizing the materials of the service should be represented along with development personnel.

7. That the Agricultural Education Sector of the Department of Agricultural Education and Rural Extension develop program objectives. It is essential that the agricultural education program be based upon realistic and attainable objectives so that staff personnel will have an understanding of program goals and a basis for making yearly evaluation of program outcomes.

8. That the Agricultural Education Sector of the Department of Agricultural Education and Rural Extension develop a yearly program of activities. A program of activities will provide staff members with clearly defined ways and means of attaining program objectives.

9. That the Department of Agricultural Education and Rural Extension provide monies in an annual budget for the agricultural schools to purchase: (1) reference materials for their libraries; (2) consumable instructional supplies such as transparency materials for teacher use; (3) visual aids to be used in classroom teaching; and, (4) needed photographic supplies such as film.

10. That a professionally competent staff be hired to administer the agricultural education program in the Department of Agricultural Education and Rural Extension. The need in hiring is threefold: (1) teacher(s) will be needed to teach recommended courses in the classroom; (2) a supervisor will be needed to conduct and coordinate existing and proposed in-service training activities; and, (3) a specialist will be needed in the preparation and distribution of instructional, curricular, and audio-visual aids for use in the agricultural schools. Level of education, experience in teaching agriculture, and professional competence are criteria which should be considered when hiring new staff members.

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APPENDIX A

CENTRAL REGION RESEARCH CONFERENCE
IN
AGRICULTURAL EDUCATION

University of Missouri-Columbia

TUESDAY JULY 29, 1975

8:30 a.m. Registration: S-200 Memorial Union

Hospitality Room: S-208 Memorial Union

9:30-11:30 a.m. FIRST GENERAL SESSION: Research in Needs Assessment and Manpower

Chairperson: Dr. Gene M. Love, University of Missouri-Columbia

Welcome: Dr. W. R. Miller, Chairman, Practical Arts and Vocational-Technical Education, UMC.

Conference Overview: Dr. Glen C. Shinn, UMC.

Keynote Address: "Research - A Practical Approach"

Dr. Earl S. Webb, Professor
Agricultural Education
Texas A & M University

"Analysis of Factors Related to Educational Plans of Iowa Vocational Agriculture Students"

Dr. Bennie L. Byler
Iowa State University

"Development of a Statewide System for Follow-Up of Vocational Graduates That Has Implementation for Usage by Local Educational Agencies"

Mr. Jeff Moss
Purdue University

Discussion: Dr. Donald D. Osburn, University of Missouri-Columbia

1:30-4:30 p.m. SECOND GENERAL SESSION: Research in the Implementation of Needs

Chairperson: Dr. Curtis Weston, University of Missouri-Columbia

"Factors Influencing Ninth- and Tenth-Grade Vocational Agriculture Enrollment Decisions and Level of Competency of Students Entering Area Vocational Centers"

Mr. Larry D. Householder
Ohio State University

"Determination of a Common Core of Basic Skills for Vocational Agriculture Instruction"

Dr. J. David McCracken
Ohio State University

"A Comparison of Agricultural Education Students and Students in Other Agricultural Curricula and Factors Related to Their Curriculum Choice"

Mr. Carl L. Reynolds
University of Illinois
Urbana-Champaign

Discussion: Mr. Carl Humphrey, Director, Agricultural Education, Department of Elementary and Secondary Education, Missouri

6:00-9:00 p.m. Family Picnic: Cosmo Park

Sponsored by Farmland Industries, Kansas City, Missouri

WEDNESDAY JULY 30, 1975

9:30-11:30 a.m. THIRD GENERAL SESSION: Research in Educational Methology

Chairperson: Dr. Robert Walker, University of Illinois-Urbana-Champaign

"Development Instructional Materials for Use by Indiana Vocational Teachers in Teaching Leadership and Character Development to Youth in Indiana"

Dr. William B. Richardson
Dr. David L. Howell
Purdue University

"Effects of Class Time, Practice Time, and Teaching Methods Upon Cognitive and Psychomotor Skill Achievement in Teaching Small Gas Engines"

Dr. William W. Bushmeyer, Jr.
Central Missouri State University

Discussion: Dr. David Williams, Iowa State University

1:30-2:00 p.m. Business Session

Chairperson: Dr. Glen C. Shinn, University of Missouri-Columbia

2:00-4:30 p.m. FOURTH GENERAL SESSION: Research in Diffusion and Adoption

Chairperson: Dr. Frank Bobbitt, Michigan State University

"The Dissemination/Diffusion Process in Selected Florida Schools"

Dr. James W. Hensel
University of Florida

"Agricultural Education System/Process: The Diffusion of Agricultural Technology With a Discussion of the Contest as a Diffusion Technique"

Dr. Ted Buila
Southern Illinois University-Carbondale

Discussion: Dr. Earl Russell, Center for Vocational-Technical Education

7:00 p.m. Buffet: Memorial Union

Sponsored by Missouri Farmers Association, Columbia, Missouri

THURSDAY JULY 31, 1975

9:30-11:30 a.m. FIFTH GENERAL SESSION: Research in Program Evaluation and Accountability

Chairperson: Dr. William B. Richardson, Purdue University

"A Method for Record-Keeping and Analysis of Equipment and Related Costs of Educational Programs"

Ms. Ruth G. Thomas
University of Minnesota

"Evaluation of Agricultural Education Program Activities at the Federal University of Santa Maria, Brazil, 1971-1973"

Dr. Richard F. Welton
Southern Illinois University-Carbondale

Discussion: Dr. J. Robert Warmbrod, The Ohio State University

Summary Remarks and Challenges: Dr. Earl S. Webb, Texas A & M University

APPENDIX B

RESEARCH CONFERENCE FOR AGRICULTURAL EDUCATION

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APPENDIX C

MINUTES, BUSINESS SECTION

Wednesday, July 30, 1975

The business session which was chaired by Dr. Glen C. Shinn was called to order at 1:45 p.m.

The first order of business was selection of a site and date for the 1976 Conference. A motion was passed unanimously to accept the invitation of the Department of Agricultural Education at the Ohio State University to be host of next year's Conference. A motion was also passed for Ohio State to poll the involved states as to what dates would be best for the Conference. Three alternatives to be considered were: (1) the dates that correspond to this year's Conference; (2) one week before the dates that correspond to this year's Conference; or, (3) one week later.

Suggestions were introduced to make Conference improvements for next year. The improvements included: time to discuss needed research for the future and exchanged ideas with one another in groups.

Meeting adjourned.

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